# Aksum University
# College of Agriculture

## Department of Agricultural Economics

# Value Chain Analysis of Poultry in Adwa Wereda, Central Zone of Tigray, Ethiopia

**By: Goitom Gebremedhin**

A thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Masters of Science in Agribusiness and Value Chain Management

Major Advisor: Bezabih Emana (PhD)
Co- Advisor: Berhanu Gebremedhin (PhD)

***October, 2015***
***Shire, Ethiopia***

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| Bezabih Emanna (PhD)<br>Major Advisor | Signature | 13 October 2015<br>Date |
| Berhanu Gebremedhin (PhD)<br>Co-Advisor | Signature | Dec 26/15<br>Date |

As member of the Board of Examiners of the MSc Thesis Open Defense Examination, we certify that we have read, evaluated the Thesis prepared by Goitom Gebremedhin Welegebriel and examined the candidate. We recommended that the Thesis be accepted as fulfilling the Thesis requirement for the Degree of Master of Science in Agribusiness and Value Chain Management.

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| Name of Chairman | Signature | Date |
| Name of Internal Examiner | Signature | 21/01/2016<br>Date |
| Name of External Examiner | Signature | 27/12/15<br>Date |

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# STATEMENT OF THE AUTHOR

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Place: Aksum University, Shire – Endaslassie

Date: October, 2015

# DECLARATION

This is to certify that this thesis entitled ‘‘Value Chain Analysis of Poultry: the Case of Adwa Wereda Central Zone of Tigray, Ethiopia” submitted in partial fulfillment of the requirements for the award of the degree of M.Sc., in Agribusiness and Value Chain Management to the School of Graduate Studies, Aksum University, through the Department of Agricultural Economics, done by **Mr. Goitom Gebremedhin Welegebriel**, Id.No. **AKU/SC/PG/04/13** is an authentic work carried out by him/her under my guidance. The matter embodied in his project work has not been submitted earlier for award of any degree or diploma to the best of my knowledge and belief.

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|---|---|---|
| Goitom Gebremedhin | _____ | _____ |
| Name of Student | Signature | Date |
| Dr. Bezabih Emana | _____ | _____ |
| Name of Major Advisor | Signature | Date |
| Dr. Berhanu Gebremedhin | _____ | _____ |
| Name of Co-Advisor | Signature | Date |

# BIOGRAPHICAL SKETCH

The author was born on November 12, 1983 in Axum, Central Zone of Tigray National Regional State. He attended his elementary and junior education at Seka Primary school at Adiet and Secondary School in Axum Comprehensive High School. Then he joined Jimma University in 2004 and graduated with B.Sc. in Animal production and health on June 2006.

He had worked in Abergelle international livestock development Plc. as nutrition expert for two years, and about seven years in Shire ATVET (Agricultural, Technical, Vocational Education and Training) College, North Western Tigray Zone as Instructor. Soon after, he joined Aksum University in January 2013 to pursue his M.Sc. degree in Agribusiness and Value Chain Management.

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# ABBREVATION AND ACRONYMS

| | |
|---|---|
| BoARD: | Bureau of Agriculture and Rural Development |
| CSA: | Central Statistics Agency |
| DA: | Development Agent |
| ESAP: | Ethiopian Society of Animal Production |
| FAO: | Food and Agricultural Organization |
| FCP | Final Consumer Price |
| FGD: | Focus group discussion |
| FTC: | Farmers Training Center |
| GMM: | Gross Marketing Margin |
| GDP: | Gross Domestic Product |
| ILRI: | International Livestock Research Institute |
| MM: | Marketing Margin |
| MoARD: | Ministry of Agriculture and Rural Development |
| MPV: | Marketed Poultry Volume |
| MSME: | Medium Scale micro Enterprise |
| NBE: | National Bank of Ethiopia |
| NGOs: | Non-Governmental Organizations |
| NMM: | Net marketing margin |
| OoARD: | Office of Agriculture and Rural Development |

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|---|---|
| OLS: | Ordinary Least Square |
| REST: | Relief Society of Tigray |
| SPS-LMM: | Sanitary and Phytosanitary Standards and Livestock Meat and Marketing |
| TGMM: | Total Gross Marketing Margin |
| TLU: | Tropical Livestock Unit |
| UNIDO: | United Nations Industrial Development Organization |
| USAID: | United States Agency for International Development |
| VCA: | Value chain analysis |
| VC: | Value Chain |
| VIF: | Variance Inflation Factor |

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# *ABSTRACT*

*This study was initiated to analyze poultry value chain in Adwa wereda, central zone of Tigray region. The specific objectives were to map poultry value chain functions, to determine the profit margin of actors along the poultry value chain, to identify factors that determine poultry market participation decision and its supply to the market and to identify major constraints and opportunities along poultry value chain. The data were collected from individual farmer using questionnaire. A total of 200 poultry producing sample households from four potential poultry producing Tabias of the wereda were surveyed. Descriptive statistics such as t-test and chi-square were employed to examine the existence of statistically significant differences between the poultry market participants and non-participants. Moreover, margin analysis was used to calculate the marketing margin of participants and traders along the poultry value chain in the study area. The major marketing channels and main actors involving in the market were identified. Marketing channels of egg and chicken indicated a shorter path. The major market actors in the survey period were producers, collectors, wholesalers, retailers and consumers. To evaluate poultry market performance cost, profit and marketing margins were calculated for the group of market players in different channels. The producer's share of the total consumer price and the total gross marketing margin were 100% and zero in channel I respectively. Heckman two stage econometric model was used to identify factors determining market participation decision and value of poultry sales. Results obtained from the first stage of the model indicated that sex of the household head, number of chickens owned and extension contact were the variables that influenced the decision to participate in poultry and egg market positively while distance to the wereda market influenced the decision to participate in poultry and egg market negatively. Results from second stage of the model shows that the number of chickens owned and access to extension contact influenced the value of poultry sales by the market participants positively while distance to the wereda market and exotic poultry breed influenced volume of poultry sold by the participants negatively. Results from second stage of the model also shows that, number of poultry owned, access to credit, exotic poultry breed, education status and years of experience in farming influenced the value of egg sales positively while age of the household head were found to be influence egg supply to the market negatively. Poultry production was constrained by diseases, extension service, limited supply of exotic chicken, poor housing and feeding systems. Some of the diseases identified by the sample households were new castle, avian pasterolosis, coccidosis, Salmonellosis, pulorum disease and fowl pox. Traders were also constrained by lack of poultry and egg supply, trade license and diseases. In spite of this, it had also opportunities such as high turnover earning, small feed and space requirement, lower initial cost requirement, and employment opportunities. Therefore, raising awareness and capacity building of both farmers and DAs on how to manage poultry and incorporate new technologies, market information and modern inputs are the actions to be taken to strengthen the sector's contribution to the wereda's economic development.*

**Key words**: Value Chain Mapping, Value Addition, Profit Margin, Econometric

# 1. INTRODUCTION

## 1.1 Background

Agriculture is a corner stone of the Ethiopian economy and building block of the social life of the people. Livestock production is an integral part of Ethiopia's agricultural sector and plays a vital role in the national economy. This livestock sector has been contributing considerable portion to the economy of the country, and still promising to rally round the economic development of the country. Livestock contributes about 20% of the GDP, supporting the livelihoods of 70% of the population and generating about 11% of annual export earnings (SPS-LMM, 2010). Ethiopia has an estimated 52.13 million cattle, 24.2 million sheep, 22.6 million goats, and 44.89 million poultry birds, which exists in private holdings (CSA, 2012).

Ethiopia ranks first in Africa and tenth in the world with respect to the livestock population (Gebregziabher, 2010). However, livestock production is constrained by traditional technologies, limited supply of inputs (feed, breed and water), high diseases prevalence, poor or non-existent of extension service, limited credit services, lack of marketing support service, poor marketing infrastructure and lack of market information. The growing domestic demand, which results from increased urbanization, higher income due to economic growth, and growing population, offers significant incentive for increased market oriented livestock production (Gebremedhin *et al.,* 2007). Poultry production as part of livestock production could be one alternative income generating mechanism and improving nutritional status for rural households in developing counties (Holloway and Ehui, 2002). Demographic changes and increasing consumer sovereignty are important trends in agro-food systems that agribusinesses must harness. Poultry meat is the fastest growing component of global meat production, consumption, and trade, with developing and transition economies contributing a leading role in the expansion (USAID, 2010).

The poultry sector in Ethiopia can be categorized into three major production systems. These are village or backyard poultry production systems, small-scale semi-commercial poultry production systems, and commercial poultry production systems (Bush, 2006). The poultry

sector is almost exclusively dominated by backyard and small-scale production using limited inputs in production and which is targeted for either self-consumption or the market (Ayele *et al.*, 2010). Poultry contributes to household nutrition, as many rural poor households rely on their own poultry production to supply most of their animal food. Poultry provides not only protein but also highly-bioavailable essential micronutrients, such as iron, vitamin A and zinc, which are crucial especially for child nutrition and health (Iannotti *et al*., 2008). USAID (2010) reveals that, the indigenous poultry sector constitutes over 99% of all poultry produced and consumed in Ethiopia. The modern poultry sector in Ethiopia comprises a few small to medium scale semi-commercial producers and even fewer large-scale commercial farms. These producers, especially large-scale farms, have strong backward and forward linkages in the economy (Alemu *et al*., 2008).

The Ethiopian poultry value chain is not well developed and is traditional. Marketing of poultry and poultry products at open markets is common throughout the country and both live birds and eggs are sold on road sides (Demeke, 2007). The value chain is often very short, mainly through a direct interaction of producers and final consumers in live-bird markets, which is described as a simple 'chain'. Livestock and Irrigation Value Chains for Ethiopian Smallholders (LIVES) project was initiated with the objective to transform smallholders into more commercial farmers through value chain based interventions in high value livestock commodity development (ILRI, 2013). Poultry production in Adwa wereda offers important opportunity to increase household income, especially for women and landless youth. Efforts to promote market oriented poultry production in the study area have not succeeded mainly due to limited scale of production, severe feed supply, poor genetic potential and poor veterinary services (ILRI, 2013).

Poultry production and productivity remains low despite the rapid population growth of the country in general and in Tigray in particular. There is also low market access for the produced agricultural products especially in the remote areas of the region. Therefore, poultry productivity and marketing problems can be solved by creating functional value chain in the study area.

## 1.2 Statement of the Problem

The increasing proportion of the population living in urban areas and the increasing level of income requires highly organized livestock management activities (Gebregziabher, 2010). The demand for livestock products as well as poultry and its products is increasing from time to time. Despite the high demand for livestock products especially poultry products, producers in Ethiopia are not market oriented and the production system is characterized by low productivity and scavenging type. This in turn leads to very small poultry and egg supply compared to the high potential the country has in the subsector (Zeberga, 2010). It is widely recognized that an inefficient marketing system entailing substantial costs to consumers and less incentives to producers could not provide the mechanism to meet the accelerating demand for high quality food items (Zeberga, 2010). One means of investigating the function of poultry value chain is through studying and identifying input suppliers, producers, traders, individual consumer characteristics, and chicken attributes that determine the price of poultry. Often farmers are not attracted by new technology even when it appears to be better than their current practices due to value chain limitation (Hailemiceal, 2007).

Even though poultry production plays an important role in the livelihood of the Ethiopian people, there is no compiled and rigorous analysis on value chains of poultry in different parts of the country, especially in the study area, which is Adwa wereda of Tigray regional state. The production and marketing systems of poultry in the study area is poorly implemented due to different production and market constraints. Moreover, information concerning the poultry production and marketing system, major constraints, the determinants for chicken and eggs supply in the market, factors that hinder chicken value chain function and the distribution in profit margin along the poultry value chain have not yet been studied in the study area. This study is, therefore, proposed to fill the knowledge gap in how the poultry value chain functions and identify the major actors and their constraints and propose means to upgrade the value chain and also provide information regarding poultry production and management system, constraints and opportunities of poultry production and marketing, factors determining poultry supply and marketing decision, profit margin along the value chain in order to narrow the information gap on the whole poultry value chain.

## 1.3 Research Questions

1. What does the poultry value chain map look like in the study area?
2. How is the profit margin of actors distributed along the poultry value chain?
3. What are the factors that determine poultry market participation decision and product supply?
4. What are the major opportunities and constraints along poultry value chain?

## 1.4 Objectives

### 1.4.1 General objective

The general objective of this study was to analyze poultry value chain functions, profit margins along the value chain, major constraints and opportunities along the value chain in Adwa wereda, Tigray regional state.

### 1.4.2 Specific objectives

1. To map poultry value chain functions;
2. To calculate the profit margin of actors along the poultry value chain;
3. To identify factors that determine poultry market participation decision and product supply to the market; and
4. To identify major constraints and opportunities along poultry value chain.

#### 1.5 Scope and Limitation of the Study

#### 1.5.1 Scope of the Study

The study was focused on the value chain analysis of poultry only in rural Adwa wereda, Central zone of Tigray in its four selected Tabias as a case of reference (Betehanes, Wedikeshi, Endamariam Shewito and Debregenet). The study areas were selected purposively because the Tabias are representative for low, mid and high altitude Tabias, good potential for

poultry production and serving as pilot learning Tabias of the sponsoring organization ILRI. It used data generated through a survey representative sample households selected using probability sampling technique. Both quantitative and qualitative data were collected from respondents. Conceptually, the central attention of this research was mapping poultry value chain functions, identifying major constraints and opportunities, identifying the distribution of profit margin along the poultry value chain actors in the study area. It also tried to identify factors affecting farmers' poultry market participation decision and poultry supply to the market. Generally, it identified the poultry value chain functions, major constraints and opportunities at each value chain function in the selected Tabias.

### 1.5.2 Limitation of the Study

The main limitation of the study was on area coverage of the study area and it focused only in Adwa wereda in its four selected Tabias. There are a number of known districts in poultry production in the region. However, this study didn't represent the whole value chain of poultry in the region as well as the study wereda due to budgetary and time limitation. In addition to that, data was not collected from the total population but from the sampled producer households and this situation could limit for the complete value chain analysis of poultry in the study area.

## 1.6 Significance of the Study

The result of this study is helpful to provide clear information for all value chain actors on the current poultry value chain map, major constraints and opportunities of poultry production and marketing, factors affecting poultry market participation decision and supply, marketing margins and related issues in the study area. Thus, there is a strong need to support and encourage small scale poultry producers to achieve sustainable and fair poultry production and marketing in order to increase their income and sustain their livelihoods. The implication is that there is a need to carryout research and generate information to identify alternative means in which the poultry producers and other actors can overcome the trade barriers, improve and add value to their products, and become stronger negotiators in local, regional,

and international markets, thereby improving their income. The information generated from this research can be used by investors, farmers, traders, researchers and others who need this information for different purposes.

## 1.7 Organization of the Thesis

Chapter one has enveloped introductions, statement of the problem, research questions, objectives, scope and limitations of and significance of the study. The second chapter has intensely reviewed the available literature by involving general concepts of value chain, value addition, governance, marketing, value chain mapping, value chain upgrading, marketing channel, value chain analysis, empirical research results executed elsewhere and conceptual frame work of the study. The third chapter has enveloped components of the research methodology including description of the study area, types of data and sources, method of sampling and sample size, method of data collection and its analysis. In chapter four, both descriptive and econometric results are discussed and presented by comparing it with the results of other studies. Brief summaries of important findings, conclusions and recommendations are presented in chapter five.

# 2. LITRATURE REVIEW

This chapter gives theoretical and empirical highlights for the study. It is intended to provide insights on definition and concept of value chain, and review of literatures on value chain analysis.

## 2.1 Basic Concepts

### 2.1.1 Value chain

The value chain is a concept which can be simply described as the entire range of activities required to bring a product from the initial input-supply stage, through various phases of production, processing and trading to its final market destination. The production stages entail a combination of physical transformation and the participation of various producers and services, and the chain includes the product's disposal after use. As opposed to the traditional exclusive focus on production, the concept stresses on the importance of value addition at each stage, thereby treating production as just one of several value-adding components of the chain (Kaplinky, 2000). The concept of value chain encompasses the issues of organisation and coordination, the strategies and the power relationship of the different actors in the chain. Value chains provide the framework for designing and implementing many development programs and projects (UNIDO, 2009).

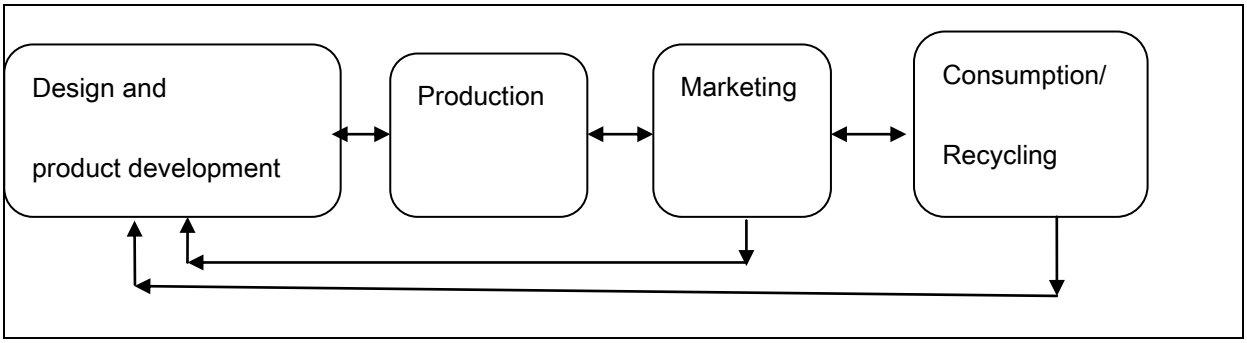



Figure 1: Four links in a simple value chain
Source: Kaplinsky and Mike, 2000.

### 2.1.2 Value addition

Value-addition is a measure for the wealth created in the economy. Referring to the definition used in systems of national accounting, total value-added is equivalent to the total value of all services and products produced in the economy for consumption and investment (the gross domestic product - GDP), net of depreciation. To arrive at the value-added generated by a particular value chain, the cost of bought-in materials, components and services has to be deducted from the sales value (GTZ, 2007). According to USAID (2012), the main value addition activity in the value chain is performed by producers which fatten the animals. The other value addition component comes mainly from the butcheries where livestock are slaughtered and cuts are produced.

### 2.1.3 Poultry Value Chain

The value chains for indigenous chickens in East Africa are disorganized with no clear investment opportunity for both private and public partnerships. Bio-security practices are found to be particularly low in all the parts of the value chain for indigenous chicken (Landes *et al.*, 2004). To understand the value chain, it is essential to begin by drawing a simple diagram that shows the key processes and inputs that contribute to the final product.
Generally, the value chain of most agribusinesses include input supply, agricultural production, first level handling, processors, wholesalers, retailer and consumers (Cloy 2005).

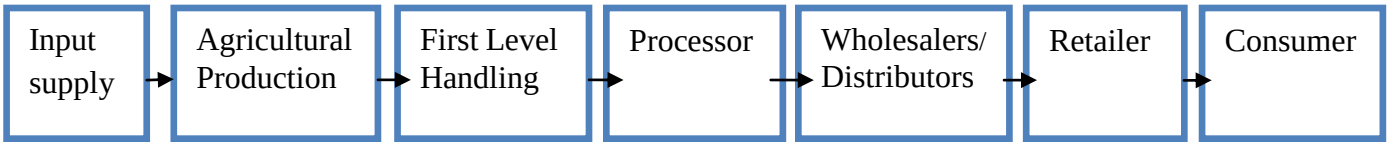



Figure 2: A typical value chains for agricultural products.
Source: Cloy, 2005.

Traditional poultry producers in the backyard system take on the various functions of other stakeholders in the chain, such as distribution and marketing. The value chain is often very short, mainly through a direct interaction of producers and final consumers in live-bird markets, which is described as a simple ‘chain’. An important feature of the poultry marketing

system in the traditional system is that traded volumes tend to be small, averaging 10-50 chickens for a given transaction (Yadeta et *al.*, 2003). Ayele *et al.* (2010), explains that the Ethiopian traditional poultry sector is largely characterized as having no backward linkages with Value chain actors.

The modern poultry sector in Ethiopia comprises of a few small to medium scale semi-commercial producers and even fewer large-scale commercial farms. These producers, especially large-scale farms, have strong backward and forward linkages in the economy. Large-scale commercial poultry farms involve a highly intensive production system with 10,000 or more birds kept under indoor conditions with a medium to high bio-security level (Alemu *et al.*, 2008). This system depends heavily on imported exotic breeds that require inputs such as feed, housing, healthcare, and a modern management system.

The Value Chain (VC) is made up of functions, operators, service providers, framework conditions and attitudes. Know how on poultry value chain and value of poultry to owners and traders is a starting point for understanding how small-scale poultry development can contribute to household income and well-being (KIT *et al*., 2006).

The local chicken value chain consists of specific inputs, breeding, production, collection and processing, transport and trading, and consumption. Value chains are affected by, market infrastructure, price variations (short or long term) access to knowledge and emerging technologies and groups that can directly influence the dynamics of the value chain (KIT *et al*., 2006). Value chains for the traditional poultry sector are not that complex. Only a few intermediaries such as collectors liaise between producers and consumers. Traders are sometimes important for small-scale backyard farmers, but their influence is often seasonal or indirectly mediated in spot markets. In addition to that, farmers themselves play the function of processors, transporters, and sellers of their products, directly interacting with consumers either in the village market or live-bird markets. There are no specific governance structures established for domestic production and marketing. Interactions are largely ad hoc, with limited to no coordination between different actors in the value chain (Ayele *et al.*, 2010).

### 2.1.4 Value chain actors

Value chain actors are those involved in input supply, producing, processing, trading and consuming the poultry and eggs. It includes the direct actors such as input suppliers, producers, traders and consumers (Florence, 2013). Each actor plays specific roles at different points of the value chain. Households produce poultry and eggs, they exchange breeding stock with neighbors, or buy from traders, market and hatchery. Eggs are sold to primary egg collectors, neighbor, and local market to local consumers. Secondary traders transport eggs from rural areas to urban markets where they sell to urban consumers through supermarkets, shops and restaurants (KIT *et al.,* 2006). In a wider sense, certain government agencies at the macro level can also be seen as value chain actors if they perform crucial functions in the business environment of the value chain in question (GTZ, 2007).

### 2.1.5 Governance

Governance is a dynamic feature of value chains that characterizes the relationships or linkages among the actors in the chain and is a central concept to value chain analysis. Governance is important as it relates to the ability of a stakeholder to determine, control and/or coordinate the activities of other actors in the value chain. At any point in the chain, a firm (or organization or institution) can set parameters under which others in the chain operate. It is particularly important for the generation, transfer and diffusion of knowledge leading to innovation, which enables firms to improve their performance and sustain competitive advantage (Humphrey and Schmitz, 2002).

Governance ensures that interactions between firms along a value chain exhibit some reflection of organization rather than being simply random. Value chains are governed when parameters requiring product, process, and logistic qualification are set which have consequences up or down the value chain encompassing bundles of activities, actors, roles, and functions (Kaplinsky, 2000). Backyard poultry producers have weak linkages and coordination mechanisms among them internally and with other actors. The major actors involved in the simple chain include farmers, agricultural research stations, agricultural extension services, NGO, consumers and, to some degree, traders (Ayele *et al.,* 2010).

### 2.1.6 Marketing

Marketing is the performance of all business activities involved in the flow of food products and services from the point of initial agricultural production until they are in the hands of consumers. The definition of marketing as a process by which individuals and groups obtain what they need and want by creating and exchange products and values with others involves work (Kohls and Uhl, 1985).

## 2.1.7 Marketing margin

Marketing margin can be defined as a difference between the price paid by consumers and that obtained by producers; or as the price of a collection of marketing services that is the outcome of the demand for and supply of such services (Tomek and Robinson, 1990). It can be a useful descriptive statistics if it is used to show how consumers' expenditure is divided among market participants at different levels of the marketing systems (Haji, 2008). Marketing margin measures the share of the final selling price that is captured by a particular agent in the marketing chain. The size of market margins is largely dependent upon a combination of the quality and quantity of marketing services provided the cost of providing such services, and the efficiency with which they are undertaken and priced. For instance, a big margin may result in little or no profit or even a loss for the seller involved depending upon the marketing costs as well as on the selling and buying prices (Mendoza, 1995). Measuring this margin indicates how much has been paid for the processing and marketing services applied to the product(s) at that particular stage in the marketing process (Smith, 1992).

According to Tomek and Robinson (1990), marketing margins provide only one point of reference in the evaluation of performance and should be compared with measures of profits earned by marketing firms to determine whether or the margins are excessive. When there are several participants in the marketing chain, the margin is calculated by finding the price variations at different segments and then comparing them with the final price to the consumer. Consumer price is the base or common denominator for all marketing margins (Mendoza, 1995).

### 2.1.8 Value chain upgrading

According to Kaplinsky (2000), upgrading is the process to respond to new market opportunities by innovating and increasing added value to a product. It involves improvement in the process, product, functions or improving the channel. It can be Process upgrading Product upgrading Functional upgrading Channel upgrading

**Process upgrading**: increasing the efficiency of internal processes such that these are significantly better than those of rivals, both within individual links in the chain (for example, increased inventory turns, lower scrap), and between the links in the chain (for example, more frequent, smaller and on-time deliveries).

**Product upgrading**: introducing new products or improving old products faster than rivals. This involves changing new product development processes both within individual links in the value chain and in the relationship between different chain links.

**Functional upgrading**: increasing value added by changing the mix of activities conducted within the firm (for example, taking responsibility for, or outsourcing accounting, logistics and quality functions) or moving the locus of activities to different links in the value chain (for example from manufacturing to design).

**Chain upgrading**: moving to a new value chain for the production of a different product by adding activities in a new value chain.

#### 2.1.9 Marketing channels

It is a business structure of interdependent organizations from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstong, 2003). Marketing channel analysis is useful tool to examine the series of intermediaries and their systematic linkage in performing marketing functions and information flow in the market chain to facilitate the flow of goods and services from the point of production to the end users. This knowledge is acquired by studying the participants in the process, i.e. those who perform physical marketing functions in order to obtain economic benefits (Beshargo, 2002). This channel may be short or long depending on the kind and quality of the product marketed, available marketing services, and prevailing social

and physical environment (Islam *et al.*, 2001). According to Zeberga (2010), the amount of marketing costs is directly related to the length of the marketing channel.

## 2.2 Value Chain Analysis

Value chain analysis is the process of breaking a chain into its constituent parts in order to better understand its structure and functioning. Value chain analysis starts with the selection of a value chain (M4P, 2008). The analysis consists of identifying chain actors at each stage and discerning their functions and relationships; determining the chain governance, or leadership, to facilitate chain formation and strengthening; and identifying value adding activities in the chain and assigning costs and added value to each of those activities. The flows of goods, information and finance through the various stages of the chain are evaluated in order to detect problems or identify opportunities to improve the contribution of specific actors and the overall performance of the chain. Value chain analysis also reveals the dynamic flow of economic, organizational and coercive activities involving actors within different sectors. It shows that power relations are crucial to understanding how entry barriers are created, and how gain and risks are distributed (UNIDO, 2009).

Value chain analysis plays a key role in understanding the need and scope for systemic competitiveness. The second reason why value chain analysis is important is that it helps in understanding the advantages and disadvantages of firms and countries specializing in production rather than services, and why the way in which producers are connected to final markets may influence their ability to gain from participating in global markets (kaplinsky, 2000). Segmenting the value chain allows for better understanding of the constraints and opportunities within each segment, as well as the context in which the chain operates ( world bank, 2007).

### 2.2.1 Poultry Value Chain Mapping

The value chain map is a graphic depiction of the structure and functions in a particular value chain and is useful in illustrating relationships between firms. The first step in value chain

mapping is to find the core processes involved in the chain and then the value chain actors who are involved in the value chain should be identified according to their function (M4P, 2008). The value chain structure typically includes the industry's various market segments, their relative importance and growth rates, the channels (or supply chains) that serve these markets and the value chain participants, including service providers, with particular attention to the how these relationships affect the distribution of and access to information, learning and benefits to firms in the value chain (USAID, 2006).

The poultry value chain involves diverse actors, from producers to consumers. It shows the macro-meso-micro actors involving the producers, the processors, the traders, NGOs, and the public or the government including policy drivers. The product flows include the inputs to support modern poultry farms (and, to a lesser extent, small-scale producers), the various products produced by the sector, and by-products (USAID, 2010). Value system is a multi linked value chain. In contrast to the "value chain", which considers value added within a business, the value system extends the value chain beyond the boundaries of the business and recognizes that a business is dependent on relationships with suppliers and buyers. A Value system encompasses the value chain actors, service providers, the business itself, the firm distribution channels and the institutional environment in which the value chain actors and service providers operate (porter, 1985).

Rural households can be characterized by a simple chain mainly linking producers directly to consumers. Farmers in this chain sell directly to consumers or simply to village markets. Related to this chain, traders are largely called collectors in the village market. Although the traditional production system and market orientation differ across regions of Ethiopia, backyard production systems are commonly considered to be a supplementary activity to other agricultural activities, accounting for up to 20% of annual income. The value chain for traditional poultry rearing starts from input use, passes product flows, and enters final consumption through the distribution chain of traders and super markets (Ayele, 2009).

## 2.3 Empirical Studies

Ethiopian indigenous poultry have low productivity and their average annual egg production is estimated at 60 eggs per year. Low productivity is also due to low hatchability at about 70% and high mortality. It is estimated that 40-60% of chicks die during their first eight weeks mainly due to disease and predators (Demeke, 2007). The same source also found that low productivity of indigenous poultry can be partly attributed to the fact that traditionally chickens receive little care. At night they are sheltered in small hen houses or in a room of the family house, to protect them from predators and bad weather. According to USAID (2012), lack of efficient extension program which combines credit supply, training, market information and technical assistance, left a gap on livestock production and lesser economic gain from the sector by the farmers.

According to Ayele *et al*. (2010), major actors in this sector include small-scale farmers, government-owned poultry multiplication centers, traders and collectors. Producers in backyard systems tend to have smaller flock sizes than commercial farms, generally with less than 40 scavenging birds feeding on broken grains, insects, kitchen wastes, green vegetables and leaves, and anything edible in the surrounding areas. According to Zeberga (2010), poultry production and trading are profitable in the smallholders' production system due to its low and abundant input requirements such as capital and labor than alternative business activities.

Results obtained from the first stage of the Heckman's model indicated that sex of the household head, distance to the wereda market, family size and education of the household head were the variables that influence the decision to participate in poultry market negatively (Gebregzabher, 2008). Abebe (2009) found that, households who produce more quantity of honey had also supplied more to the market. According to Tadesse (2010), access to extension service had a positive effect on mango supply to the market. According to Zeberga (2010), feed supplementation highly affects the farmers' decision of bird and egg supply to the market positively at one percent level of significance. Profit margin is not fairly distributing along the value chain in Dale wereda. The highest profit margin is maintained by

urban assemblers due to the fact that they directly purchase the birds from producers in local markets and sold for whole sellers avoiding the involvement of rural assemblers in the marketing channel. The same source also found that, the most frequently mentioned bottleneck in extension service is its failure to integrate input supply and credit facilitation in the package. Inconsistency and inefficiency are also mentioned as constraint in extension service provision for the sub sector. The service also gives less weight for the production and marketing of village poultry than other crop and livestock.

## 2.4 Conceptual Framework

Value chains provide an analytical and diagnostic tool for identifying viable, remunerative income-earning opportunities for poor households in the rural developing world. The identification of value chain functions, profit margin of actors along the poultry value chain, determinant of market participation decision and volume of poultry supply to the market and constraints related to production and marketing could subject to the application of this research framework. The conceptual framework of poultry value chain comprises input supply, production activities, transporting, marketing, processing and consumption. In addition to that the frame work comprises different supporting agents such as NGO and government that can help in poultry extension services, credit service, training and infrastructure. Producers produce chicken and eggs by using different inputs and can be transported to the market. Traders purchase poultry and selling them to the next buyer and consumer to get profit margin. Poor governance or coordination among value chain actors for mutual benefit could results for the weak value chain functions. Value addition activities and profit margin are the main outcomes in the poultry value chain. Poultry production is influenced by input supply and management. Distance to the market, breed type, number of chicken owned, education level of the household and extension service could be among the factors that affect poultry market participation decision and volume of poultry and egg supply to the market. The level of profit margin along the poultry value chain actors varies according to the type of the marketing actor and length of the channel.

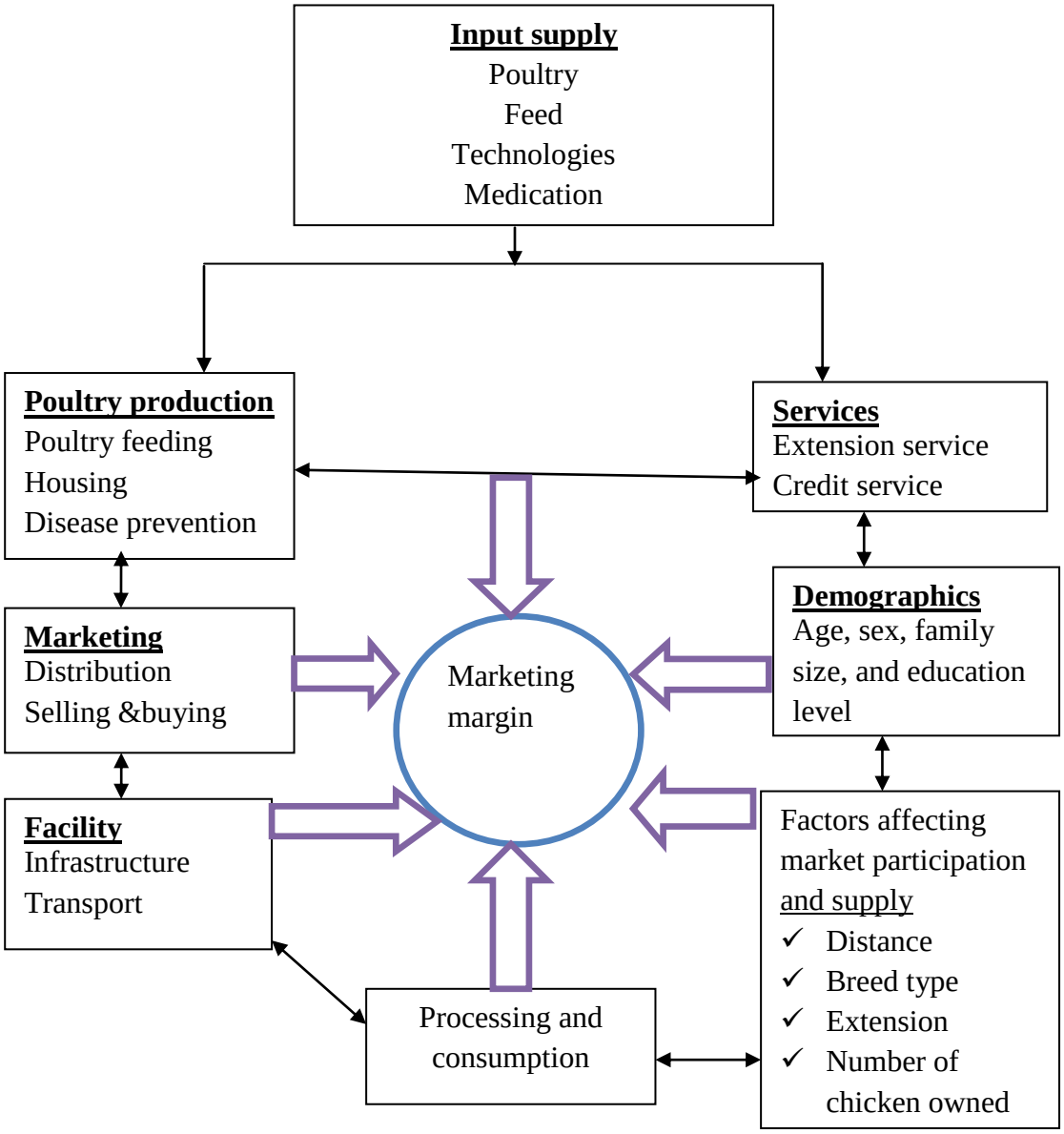



Figure 3: Conceptual framework of the study
Source: Own compilation, 2015.

# 3. MATERIALS AND METHODS

## 3.1 Description of the Study Area

Adwa wereda is located between 14$^{o}$ 19’ 25” North latitude & 39$^{o}$ 4’ 27” East longitude in central zone of Tigray. It is found about 925 km North of Addis Ababa and 235 km west of Mekelle. The distance of the study Tabias (Endamariam Shewito, Wedikeshi, Betehanes and Debregenet) from Adwa Town are 14 km, 6 km, 10 km and 18 km respectively.

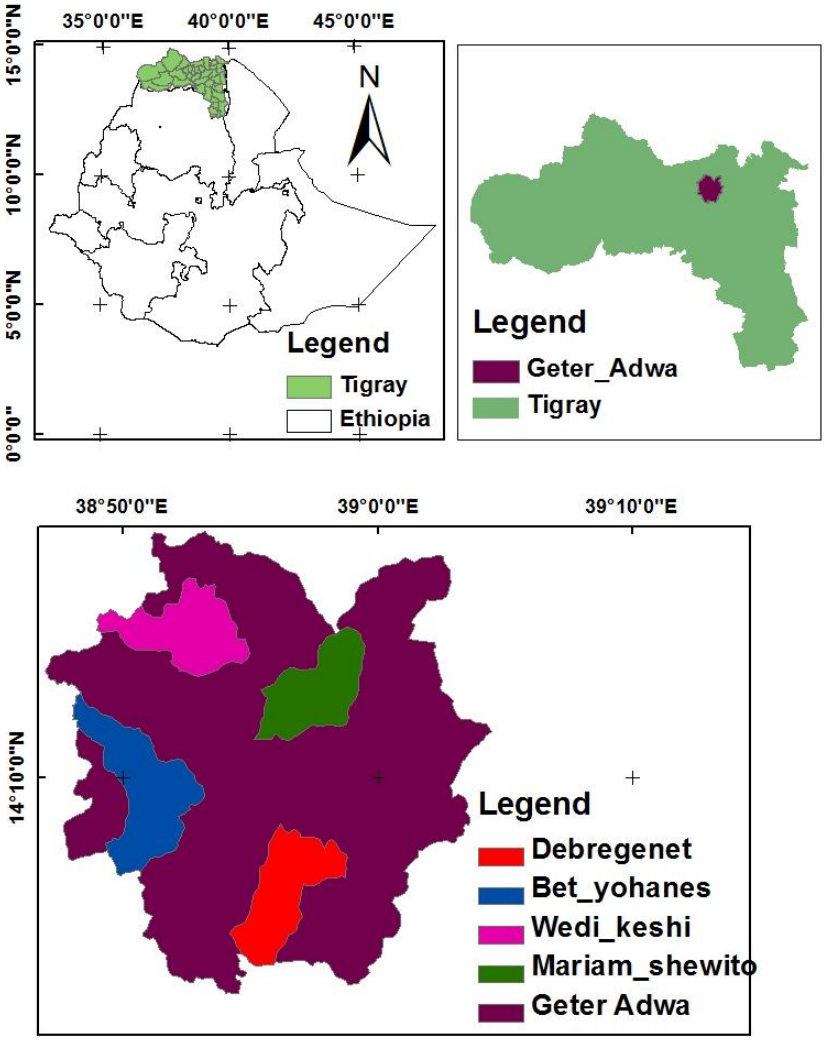



Figure 4: Map of the study area

**Altitude, Temperature and Rainfall**

The altitude of Adwa wereda ranges from 1805-2258 masl. The temperature of the area ranges from 18-28°c and mean temperature of 23°c. The mean annual rainfall of the area ranges from 600-850mm with mean of 725mm (ILRI, 2013).

**Human Population**

The total population of the wereda was 89,052. Of these population, 44,391(49.8%) and 44,661(50.2%) represented males and females respectively. this number was obtained from agricultural extension of the wereda. Tigrigna is the mother tongue for the population. The cultural food commonly used in the wereda is Injera with dero wet, shiro and keywet.

**Livestock Production**

Dairy, sheep, goats, poultry and honey bees productions are practiced in the wereda. Most of the production system is traditional and local poultry were dominant in the wereda (ILRI, 2013). Table 1 shows the types of livestock population in the study wereda.

Table 1: Livestock population

| | Number | | |
|---|---|---|---|
| Type | Local | Improved | Total |
| Cattle | 57,216 | 173 | 57,389 |
| Sheep | 46,573 | - | 46,573 |
| Goats | 85,326 | - | 85,326 |
| Poultry | 90,613 (81%) | 21602 (19%) | 112,215 |
| Honey bee colonies | 11,372 | 4,268 | 15,640 |

Source: ILRI, 2013.

**Soil type Crop Production**

The soil types of the study area are Lithic Leptosols, EutricLeptosols and Eutric Cambisols (ILRI, 2013). Mixed crop-livestock farming system is common both in the mid and lowlands of the wereda. The main cereal crops growing in Adwa wereda are maize, wheat, teff, sorghum, barely, sorghum and finger millet. The pulses growing in this wereda are Field pea,

Faba bean, lentil and chick pea. Maize, wheat, sorghum, barely and sorghum are also the main feeds for poultry in the study area. Therefore, crop production is a source of input for poultry production.

## 3.2 Research Design

Both quantitative and qualitative research data were collected and a survey type study was conducted in the study area. Descriptive type of research was adopted in this study. Poultry producers were taken as sampling frame purposively and then simple random sampling method was used to take representative respondents. A cross sectional research design was employed because; the study was conducted only in a time manner on small portion of sampled population. Structured and Semi structured questionnaire, FGD and key informant interview checklist were used to collect data.

## 3.3 Data type and source

### 3.3.1 Data type

The study used a wide range of information on different variables. Data on types of poultry reared by the producers, feeding and housing systems, productivity, price of poultry supplied, distance to market, educational status, demographic and household characteristics, access to market information, infrastructure and transaction costs were collected . Data on production, marketing information system, type of sellers and buyers and types of poultry sold were collected (Appendix 3). So, the types of data collected from the study area were both qualitative and quantitative data.

### 3.3.2 Sources of data

In order to get the overall picture of poultry value chain in the study area, the study used both primary and secondary data. The primary data on the poultry value chain functions were collected from poultry value chain actors through interview and focus group discussion. Poultry producers, traders, processors, consumers and key informants were the sources for the

primary data. Secondary data was collected from Wereda Bureau of Agricultural and Rural Development, CSA reports, from different documents and websites as well. Quantitative data was collected from secondary and primary sources. The qualitative data was also gathered through checklists and questionnaires from respondents.

## 3.4 Method of Sampling and Sample Size

With regard to sample size, it is believed that more sample households could have better representation of the target population. However, to make the research more manageable (both in time and resources) sample households were selected from the selected sample Tabias. The total numbers of Tabias found in the study area were 18 from which four Tabias were selected purposively based on information obtained from the wereda's bureau of Agriculture and Rural Development Office, accessibility to undertake the research, poultry potential and interest of LIVES project. Households that have chicken were the sampling frame for the study. Based on this, 6,066 households constituted the sampling frame. Totally, 200 respondents were selected according to the sample size determination table at alpha 0.05 (Bartlett *et al*., 2001). Then, respondents were taken using sample proportionate to size. The respondents were stratified in to female and male household heads. Finally, the households were listed with the assistance of DAs and then simple random sampling method was used to select respondents from each selected Tabias. 142 male and 58 female headed households were selected randomly from the listed sampling frame.

Table 2: Number of poultry producer households and sample taken from each Tabia

| Name of Tabias | Poultry producers* | | | Sampled HH | | |
|---|---|---|---|---|---|---|
| | Male | Female | Total | Males | Females | Total Sampled |
| Endamariam Shewito | 1161 | 503 | 1664 | 38 | 17 | 55 |
| Betyehanes | 936 | 268 | 1204 | 31 | 9 | 40 |
| Wediqeshi | 1025 | 446 | 1471 | 33 | 15 | 48 |
| Debregenet | 1204 | 523 | 1727 | 40 | 17 | 57 |
| Total | 4326 | 1740 | 6066 | 142 | 58 | 200 |

*Source: Office of agriculture and rural development and Tabias administrative data, 2015.

In addition to farm households, sample respondents were also selected from the other value chain actors on the basis of their size and availability and were interviewed based on their respective functions in the chain. Therefore, 10 collectors, 2 wholesalers, 17 retailers, 12 processers and 52 consumers were selected in the study area and Adwa town using random and purposive sampling techniques. All licensed (8) and 21 non licensed traders were selected using purposive and simple random sampling techniques respectively. Processors and consumers were also selected randomly.

## 3.5 Method of Data Collection

Enumerators working as development agents in each of the study Tabia were recruited and trained for data collection. The questionnaire was translated in to Tigrigna and backward to English languages. Then developed questionnaire was pre-tested to evaluate its design and time taken for the interview. Hence, appropriate modifications were made on the questionnaire. During data collection, the trained interviewers collected enough and accurate information or data from poultry producers in each selected Tabias to achieve the objectives of the study and avoid potential bias from the sampled households in responding to questions. Data were collected under continuous supervision of the researcher. The filled-in interview schedule was thoroughly checked for completeness and consistency. Similarly, informal surveys are employed to study the marketing systems of poultry and eggs to obtain additional supporting information for the study. Data was also collected from traders and processors through administering a structured and semi-structured questionnaire.

Key informant interview was utilized to get the relevant data that shows current poultry value chain in the study area. The key informants' interview was including: extension workers, input and output marketing experts, collectors, retailers, processors, end users, NGOs workers in the study area and poultry experts from BoARD (Appendix 3).

### 3.5.1 Focus group discussion

A checklist was developed to guide the sequence of information to be collected from the focus group discussions. Members of the focus group discussion were selected from different groups such as elders, religion leader, Tabia administrator, Tabia's women affairs, model farmers and youth associations so as to collect accurate information or data about poultry value chain functions and the current constraints on value chain of poultry in the study area. Discussions were conducted in each selected Tabias with the size of 8 persons per selected Tabia. The focus group discussion was facilitated and monitored by the researcher and every member of the group was given equal chance to express his/her ideas. Information concerning poultry value chain functions, services, constraints and opportunities were collected from the focus group discussions using checklist (Appendix 3)

## 3.6 Data Processing and Analysis

The collected data was coded and entered in to Microsoft excel to be ready for data entry and analysis. The data collected from respondents were analyzed by using SPSS 16 and STATA 10 software packages. The statistical analysis to be used in the study was depending on the type of variable and information obtained. However, this study used different categories of data analysis; namely descriptive statistics, value chain mapping or analysis and econometric analysis.

### 3.6.1 Descriptive statistics

This method of data analysis refers to the use of ratios, percentages, means, ranking and standard deviations in the process of examining and describing marketing functions, facilities, services, household characteristics, role of intermediaries; and market and trader characteristics.

**Ranking analysis**: A survey data related to the constraints of poultry value chain were analyzed using ranking index method (Musa *et al*., 2006). To address the forth objective, the study was used ranking index. The ranking index was computed as:

Index =Rn*C1+ Rn-1*C2….. +R1*Cn/ ΣRn*C1 + Rn-1*C2….. + R1*Cn; (1)

Where,

Rn = Value given for the least ranked level (example if the least rank is $5^{th}$ , then Rn = 5, Rn-1 =4, R1 =1);

Cn= counts of the least ranked level (in the above example, the count of the $5^{th}$ rank=Cn and the count of the $1^{st}$ rank=C1.

### 3.6.2 Value chain mapping/analysis

Value chain mapping was utilized to address the core processes like input supply, production functions, processing, trading and consumption with in value chain actors. In addition to that, it identified the value chain actors and their relationship, support services, types of value addition activities, constraints and opportunities of production and trading in the study area.

### 3.6.3 Marketing margin

These include the total gross marketing margin, producer's gross marketing margin, and net marketing margin. These margins can be calculated by deducting the selling price and marketing cost from the purchase price and then dividing by the price paid by the end users and the proportion and distribution of these values among marketing actors were used to analyze the performance of poultry marketing system (Gebregzabher, 2010). Using Income Statement, the cost and revenue were calculated before the ratio and margins estimation. The producers' share is the commonly employed ratio calculated mathematically as, the ratio of producers' price (ex-vessel) to consumers' price (retail). Mathematically, producers' share can be expressed as:

$$PS = \frac{P_x}{P_r} = 1 - \frac{MM}{P_r} \quad \text{…….. ( 2)}$$

Where: PS = Producers' share

$P_x$ = Producers price of poultry

$P_r$ = Retail price of poultry products which is consumer price of poultry

MM = marketing margin

The above equation tells us that a higher marketing margin diminishes producers' share and vice versa. It also provides an indication of welfare distribution among production and marketing agents. Total gross marketing margin (TGMM) is the final price of the produce paid by the end consumer minus farmers' price divided by consumers' price and expressed as a percentage (Mendoza, 1995).

$$TGMM = \frac{Consumer\ price - Farmers'\ price}{Consumer\ price} X100 \quad (3)$$

Where, TGMM = Total gross marketing margin

$$GMMp = \frac{price\ paid\ by\ the\ consumer - marketing\ gross\ margin}{Price\ paid\ by\ the\ consumer} \times 100 \quad (4)$$

Where, GMMp = the producer's marketing margins (producers share) from consumer price.

$$NMM = \frac{Gross\ Margin - Marketing\ Cost}{Price\ paid\ by\ endusers(Consumers\ price)} \quad (5)$$

Where, NMM = Net marketing margin

Higher NMM or profit of the marketing intermediaries reflects reduced downward and unfair income distribution, which depresses market participation of smallholders. The consumer price share/portion of market intermediaries is calculated as:-

$$MM = \frac{Selling\ Price - Buying\ Price}{FCP} \times 100 \quad (6)$$

This is used to analyze the second objective (marketing margin along the value chain).

### 3.6.4 Econometric analysis

Econometric model was used to identify the factors that affect farmers' participation decision in the supply of poultry and eggs to the market on the one hand and determinants of the volume of poultry and eggs supply to the market on the other hand. Most literatures adopt is Heckman's two stage model' to identify factors that affect producers' participation in the poultry supply (sale of poultry) or not and also identify the factors that determine the level of poultry (chicken and egg) supplied to market. Ideally, the OLS model is applicable when all households participate in the market. In reality not all households participate in poultry

market. If the OLS regression is estimated excluding the nonparticipants from the analysis, a sample selectivity bias is introduced into a model. Such a problem can be overcome by following a two-step procedure as suggested by Heckman (1979). The first stage of the Heckman two-stage model a 'participation equation,' attempts to capture factors affecting participation decision. This equation is used to construct a selectivity term known as the 'inverse Mills ratio' (which is added to the second stage 'outcome' equation' that explains factors affecting volume of poultry supply. The inverse Mill's ratio is a variable for controlling bias due to sample selection (Heckman, 1979 as cited in Gebregzabher, 2010). The second stage involves including the Mills ratio to the poultry supply equation and estimating the equation using Ordinary Least Square (OLS). If the coefficient of the 'selectivity' term is significant then the hypothesis that an unobserved selection process governs the participation equation is confirmed. So, this model was used to analyze the third objective.

**The participation Equation**

$$Y_{1i} = \chi_{1i}\beta_1 + u_{1i} \qquad u_{1i} \sim N(0,1) \tag{7}$$

$$PMP = 1 \text{ if } Y_{1i} > 0 \tag{7a}$$

$$PMP = 0 \text{ if } Y_{1i} \leq 0$$

Where: $\gamma_{1i}$ is the latent dependent variable, which is not observed?

$\chi_{1i}$ is vectors that are assumed to affect the probability of sampled household poultry market participation

$\beta_1$ is a vector of unknown parameter in participation equation

$u_{1i}$ are residuals that are independently and normally distributed with zero mean and constant variance

**The observation equation/the supply equation**

$$MPV = Y_{2i} = \chi_{2i}\beta_2 + u_{2i} \qquad u_{2i} \sim N(0, \delta^2) \tag{8}$$

$Y_{2i}$ is observed if and only if $PMP = 1$. The variance of $u_{1i}$ is normalized to one because only $PMP$, not $Y_{1i}$ is observed. The error terms, $u_{1i}$ and $u_{2i}$, are assumed to be bivariat, normally distributed with correlation coefficient, $\rho$. $\beta_1$ and $\beta_2$ are the parameter vectors.

$Y_{2i}$, is regressed on the explanatory variables, $\chi_{1i}$, and the vector of inverse Mills ratios ( $\lambda_i$ ) from the selection equation by ordinary least squares.

Where: $\gamma_{2i}$ is the observed dependent variable

$\chi_{2i}$ is vectors that are assumed to affect sale volume

$\beta_2$ is vector of unknown parameter in the supply equation

$u_{2i}$ is residuals in the supply equation that are independently and normally distrusted with zero mean and constant variance.

$$\lambda_i = \frac{f(\chi\beta\ )}{1-F(\chi\beta\ )}\ ) \qquad (9)$$

$f(\chi\beta)$ is density function and 1-F ( $\chi\beta$ ) is distribution function

## 3.7 Hypothesis and Variables Definition

This part of the study hypothesizes factors that influence both the participation decision of farmers and level of poultry supplied to the market. In the course of identifying factors influencing poultry supply, the main task is to explore which factors potentially influence and how these factors are related with the dependent variables.

### 3.7.1 Dependent variables

**Poultry Market Participation Decision (PMP):** Is the dummy variable that represents the market participation of the household in the market that is regressed in the first stage of two stages estimation procedure. For the respondents who participate in market, the variable takes the value of 1 where as it takes the value of 0 for the respondents who did not participate in market.

**Marketed Poultry Volume (MPV)**: It is continuous dependent variable in the second step of the Heckman selection equation. It is measured in number and represents the actual supply of chicken by poultry producer households to the market, which is selected for regression analysis, which takes positive value.

### 3.7.2 Independent variables

**Distance to nearest poultry product market (DNM):** Is location of the poultry producers from the nearest market and it is measured in kilometers**.** The closer the market, the lesser would be the transportation charges, reduced walking time, and reduced other marketing costs, better access to market information and facilities. A study conducted by Gebregziabher (2010) on analysis of poultry market chain revealed that distance to the market was negatively related to market participation decision and volume of poultry supply. In this study, distance from nearest poultry market is hypothesized to relate negatively to market participation decision and market supply.

**Total number of chickens owned (NCHO):** This is continuous variable and is measured in number of chicken. The number of poultry kept is expected to have positive relation to market participation and market supply. As the poultry or chicken owned increases, the probability to participate in market and sales would increase. The study conducted by Zeberga (2010) found that number of chicken owned was positively related with market participation and volume of poultry supply to the market. Hence, this variable is expected to influence market participation and volume of poultry marketed positively.

**Education level of the household head (EDHH):** It is continuous variable and is measured in years of formal schooling of the household head. Those household heads who have formal education determines the readiness to accept new ideas and innovations, and hence promote to get supply, demand and price information and this enhances farmers' willingness to participate and increase volume of sales. Zeberga (2010) found that formal education had positively influenced poultry market participation and market supply.

**Age of household head (AGEHH)**: It is a continuous variable and measured in age (years) of the household head. Aged households are believed to stay at home and rear poultry than active age households. Aged household head was expected to have a positive effect on market participation and marketable surplus. A similar study was conducted by Abebe (2009) on market chain analysis of honey production.

**Years of experience in farming (YEF):** It is a continuous variable; measured in the number of years that the household head spend in farming business. Higher experience in farming business may favor farming activity than poultry business. A similar study was conducted by Zeberga (2010) on analysis of poultry market chain. Hence, this variable is expected to have adverse impact on the participation on and volume of chickens and egg supplied to the market.

**Sex of the household head (SEXHH):** This is dummy variable (takes a value of 0 if the household head is male and 1 otherwise). Female household heads have been observed to have a better tendency than male household heads to enter into poultry production and marketing business. A similar study was conducted by Mesfin (2012) on honey value chain analysis. Thus, this variable is expected to have positive relationship with market participation and market supply.

**Family size (FAS):** It is a continuous variable, measured in the total number of members of the household, which affects farmer's decisions to participate in market particularly in poultry production and marketing. Any family member might decide to participate in poultry production and marketing. Labor is not a problem in the household with a large family size. A similar study was conducted by Gebregziabher (2010) on analysis of poultry market chain. Hence it is expected to affect market participation decision and value of poultry sales positively.

**Financial income from other livestock sources (FIOLS):** It is continuous variable measured in Ethiopian Birr. The variable represents income originating from other livestock by household members. Through improving liquidity, this income makes the household to expand production and or/ purchase from market. However, income from other livestock source is hypothesized to affect market entry decision by household and sale volume of poultry negatively.

**Grain availability (GA):** It is continuous variable measured in quintal. The variable represents the amount of grain obtained from crop farming. The household with grain

availability can use the grain as poultry feed and this can increase poultry productivity. In this study, this variable is expected to affect market participation decision and volume of poultry supplied to the market positively.

**Off-farm income (OI):** It is continuous variable measured in Ethiopian Birr. The variable represents income originating from off- farm activities. The household can spend the time out of the home to undertake off-farm activities and poultry management could be neglected. The household with enough off-farm income couldn't use poultry as a source of financial income and could consume what is produced in the home. A similar study was conducted by Mahmud (2008) on analysis of the role of cooperatives in agricultural Input output marketing. In this study, it is expected to affect market participation decision and volume of poultry supplied to the market negatively.

**Access to credit (AC):** Access to credit is measured as a dummy variable taking a value of 1 if the farmer has access to credit and 0 otherwise. It is assumed that, access to credit would improve the financial capacity of poultry household to buy more improved poultry breed and technology to increase poultry productivity. In addition to that, in kind credit access encouraged producers to reproduce chicken and could increase marketable surplus. A similar study was conducted by Tadesse (2011) on market chain analysis of fruits. This variable is expected to influence the marketable supply and market entry decision by poultry household positively.

**Access to poultry extension service (ACCEXT):** This variable is measured as a dummy variable taking the value of 1 if the household has access to poultry extension service and 0 otherwise. Farmers who have contact with extension workers are more likely to know the advantage of production like poultry and the availability, quality, and price of inputs. A similar study was conducted by Zeberga (2010) on analysis of poultry market chain. Therefore contact with extension agent is assumed to have positive relationship with market participation decision and volume of marketable surplus.

**Breed type (BT):** This variable is a dummy variable indicating the breed type of the birds that the household owned (exotic or local). The household owning exotic breed=1and 0, otherwise. The former type is more productive in terms of both egg and meat yield. But, due to feed requirement and disease vulnerability farmers may prefer the local breed type. A similar study was conducted by Zeberga (2010) on market chain analysis of poultry. Therefore, this variable might take both positive and negative sign on market participation and volume of poultry supply.

**Market information (MI):** This variable is a dummy variable taking the value of 1 if the household has access to market information and 0 otherwise. Farmers marketing decisions are based on market price, supply and demand information, and poorly integrated markets may convey inaccurate and inadequate information on price, demand and supply, leading to inefficient production and marketing decisions. A similar study was conducted by Abebe (2009) on market chain analysis of honey production. Therefore, it is hypothesized that market information is positively related to market participation and volume of poultry supply.

**Feed supplement (FS):** It is a dummy variable and assigned 1 for those farm households who supplement feed for their chicken and 0, otherwise. Feed supplementation for scavenging local chickens would significantly improve the productivity of local breeds. A similar study was conducted by Zeberga (2010) on market chain analysis of poultry. Thus, this variable is expected to positively influence the market participation and level of supply.

Table 3: Description of the dependent and independent variables to be used in the model

| No | Variable | Description | Type | Value |
|---|---|---|---|---|
| **1** | **Dependent variable** | | | |
| 1.1 | PMP | Poultry market participation | Dummy | 0=No 1=Yes |
| 1.2 | MPV | Marketed poultry Volume | Continuous | Volume in number |
| **2** | **Independent variable** | | | |
| 2.1 | Age (+) | Age of household head | Continuous | Number of years |
| 2.2 | Sex(+) | Gender of the household head | Dummy | 0.male, 1.female |
| 2.3 | FAS(+) | Family size | Continuous | Number of families |
| 2.4 | EDHH(+) | Education status of the household head | Continuous | Years of schooling |
| 2.5 | DNM (-) | Distance to nearest market | Continuous | Distance in Km |
| 2.6 | MI(+) | Market information | Dummy | 0.No 1,Yes |
| 2.7 | AC(+) | Access to credit | Dummy | 0.No 1.Yes |
| 2.8 | ACCEXT(+) | Access to poultry extension service | Dummy | 0.No 1.Yes |
| 2.9 | NCHO(+) | Number of chickens owned | Continuous | Number |
| 2.10 | FIOLS (-) | Financial income from other livestock sources | Continuous | Number in Birr |
| 2.11 | GA(+) | Grain availability | Continuous | Quintal |
| 2.12 | OI (-) | Off-farm income | Continuous | Number in Birr |
| 2.13 | FS (+) | Feed supplement | Dummy | 1.supplement, 0. no supplement |
| 2.14 | BT (+&-) | Breed type | Dummy | 1.Exotic, 0.Local |
| 2.15 | YEF(-) | Years of experience in farming | Continuous | Number of years |

Source: Own computation, 2015.

# 4. RESULTS AND DISCUSSIONS

The result and discussion part of this thesis consists of descriptive statistics, value chain mapping and econometric analysis. Descriptive statistics such as means, averages, percentages and probability distribution tests like T-test and chi- square test were used. Value chain mapping was used to analyze value chain functions and Heckman two-stage econometric model was also used to analyze market participation decision and poultry supply to the market.

## 4.1 Demographic and socioeconomic characteristics of sample producers

The age of the sampled respondents ranged from 20 to 76 years with an average age of sampled households was about 44. This result showed that poultry production can be performed by economically active age groups and in most cases people at younger and old age actively engages in poultry production activities. Poultry market participants were on average 43.30 years old while non-participants were 45.18 years old with statistically significant mean difference at ($p<0.10$).

Table 4 indicates that the average family size of sampled households was 5.51, with 5.53 and 5.46 for market participants and non-participants respectively with no statistically significant mean difference. The survey result with respect to land holding of the total respondents reveals that an average size of land holding per household was 0.53ha with no statistically significant mean difference between the participants (0.54ha) and non-participants (0.52ha).
Of the total sample farm households, 71% were male-headed and the remaining 29% were female headed implying that most of the sample producer households were male headed. This limited number of female participation agrees with Gebregziabher (2010). This might be due to the fact that even though parts or all of the poultry producing activities were performed by women these are reported as most of the household heads were men in the study area. In addition to that, female headed households were less than male headed households in number. Moreover, poultry market participants of sampled households, 65.6%% and 34.4% were male and female headed respectively and 80.6% and 19.4% of the non participant were male and

female respectively with statistically highly significant difference among the groups at ($p< 0.05$).

Referring to Table 4, around 46%, 54%, 38%, 15% and 0.50% of the sampled households were illiterate, literate, elementary school completed, secondary school completed, and diploma graduated respectively with statistically highly significant difference between poultry market participants and non-participants. During the survey, there were no households in the sample who had educational background above diploma (see Table 4). The survey results in general indicated that, poultry producers in the study area were mainly literate who can read and write; suggesting that with good extension and training program they can use modern poultry equipments and production systems to improve their chick and egg quality and quantity of production and market supply.

Table 4: Demographic and socioeconomic characteristics of poultry producers

| | Participant (N=128) | | Non-participant (N=72) | | Total-sample (N=200) | | $P/x^{2-}$value |
|---|---|---|---|---|---|---|---|
| | Mean | Std | Mean | Std | Mean | Std | |
| **Age (year)** | 43.30 | 8.45 | 45.18 | 9.91 | 43.98 | 9.02 | 0.078* |
| **Family size** | 5.53 | 1.67 | 5.46 | 1.78 | 5.51 | 1.71 | 0.773 |
| **Land size(ha)** | 0.54 | 0.25 | 0.52 | 0.19 | 0.53 | 0.23 | 0.652 |
| **Sex** | **No** | **%** | **No** | **%** | **No** | **%** | |
| Male | 84 | 65.6 | 58 | 80.6 | 142 | 71 | 5.00** |
| Female | 44 | 34.4 | 14 | 19.4 | 58 | 29 | |
| **Education level (Cate.v)** | | | | | | | |
| Illiterate | 46 | 36 | 46 | 64 | 92 | 46.00 | |
| Elementary | 58 | 45.3 | 18 | 25 | 76 | 38.00 | 15.00*** |
| Secondary | 23 | 17.9 | 8 | 11 | 31 | 15.50 | |
| Diploma | 1 | 0.8 | 0 | 0.00 | 1 | 0.50 | |

Significant Level: ***=1%, **=5% and *= 10% N=Sample size, Cate.v= categorical variable

Source: survey result, 2015.

## 4. 2 Source of livelihood

### 4.2.1 Land holding size and use

As shown in table 4, the average land holding size of participants and non participants was 0.54ha and 0.52ha respectively. All of the farmers used their land for crop production.

### 4.2.2 Crop production

Crop production in the study area is the common occupation and rain fall is the main source of water for their crop production. The major crops such as Teff, maize, sorghum, wheat, barley, bean and finger millet were grown in the study area. About 96% of the respondents were engaged in crop production activities. These grains were produced mainly for the family consumption. In addition to that crop production was used as a source of financial income for the farmers in the study area. As shown in table 5, there is no significant difference in most cereals but there is a significant difference in bean production at 0.1significance level.

Table 5: Farmers crop production in quintal in 2013/2014

| Crops | Participant | | Non-participant | | Total-sample | | t-value |
|---|---|---|---|---|---|---|---|
| | (N=128) | | (N=72) | | (N=200) | | |
| | Mean | Std | Mean | Std | Mean | Std | |
| Maize | 2.58 | 0.86 | 2.56 | 0.95 | 2.57 | 0.89 | 0.885 |
| Sorguhum | 2.50 | 0.79 | 2.5 | 1.1 | 2.5 | 0.90 | 0.97 |
| wheat | 1.93 | 0.75 | 1.78 | 0.47 | 1.89 | 0.68 | 0.28 |
| Barley | 2.13 | 0.74 | 2.38 | 0.77 | 2.21 | 0.75 | 0.11 |
| millet | 1.57 | 0.67 | 1.55 | 0.52 | 1.56 | 0.61 | 0.90 |
| Teff | 2 | 0.74 | 2 | 0.8 | 2 | 0.8 | 0.46 |
| Bean | 0.9 | 0. 4 | 0.6 | 0.2 | 0.80 | 0.4 | 0.1* |

Significant Level: *= 10%

Source: Survey result, 2015.

### 4.2 .3 Livestock production

Livestock production in the study area is conducted together with crop production. The types of animals managed by the farmers include cattle, sheep and goats, poultry, donkey and honey bees. Farmers in Adwa wereda reproduce and manage these different types of animals for different purposes such as milk production, animal power, meat production, egg production and honey production. Therefore, livestock was mainly used as a source of financial income in the study area.

Table 6: Total number of livestock per household

| Livestock | Participant | | Non-participant | | Total-sample | | P-value |
|---|---|---|---|---|---|---|---|
| | (N=128) | | (N=72) | | (N=200) | | |
| | Mean | Std | Mean | Std | Mean | Std | |
| Cows | 0.84 | 0.61 | 0.90 | 0.53 | 0.86 | 0.58 | 0.44 |
| Oxen | 1.31 | 0.84 | 1.51 | 0.60 | 1.39 | 0.77 | 0.08* |
| Sheep | 2.64 | 2.77 | 2.69 | 2.63 | 2.66 | 2.72 | 0.89 |
| Goats | 3.14 | 3.50 | 4.60 | 3.29 | 3.67 | 3.49 | 0.004*** |
| DonkeyA | 0.37 | 0.57 | 0.61 | 0.68 | 0.46 | 0.62 | 0.007*** |
| DonkeyY | 0 | 0 | .028 | 0.17 | 0.01 | 0.09 | 0.06* |
| Heifers | 0.56 | 0.62 | 0.79 | 0.69 | 0.65 | 0.66 | 0.02** |
| Bulls | 0.48 | 0.56 | 0.86 | 0.54 | 0.62 | 0.58 | 0.000 |
| Calves | 0.52 | 0.57 | 0.61 | 0.52 | 0.55 | 0.56 | 0.245 |
| Chickens | 10.93 | 8.98 | 5.72 | 3.67 | 9.10 | 7.91 | 0.000 |
| Bee | 0.45 | 0.85 | 0.65 | 0.73 | 0.52 | 0.81 | 0.08 |
| TLU | 917.89 | | | | | | |

Significant Level: ***=1%, **=5% and *= 10% DonkeyA= Adult, DonkeyY =young

Source: Survey result, 2015.

### 4.2.4 Off-farm income

The other source of income for the sample household was from activities such as tapping, construction, gold extraction, guard, pension, trade in livestock and grain. The involvement of sample respondents in various off-farm activities reflects that poultry keeping can be exercised as part time activity to supplement the household livelihood (Table 7).

### 4.2.5 Household income

Crop production plays a minimum role in income generation in the area since they used for home consumption. For the total sampled households, the average income generated from selling of crops was Birr 33.11 per annum with no statistically significant difference between poultry market participants (was Birr 29.53) and non-participants (was Birr 39.44). Moreover, Birr 2,166 was an average annual income which is obtained from off-farm income sources (tapping, construction, gold extraction, guard, pension, trade in livestock and grain, etc) of the sampled households with no statistically significant difference between the group poultry market participant and non-participant. The total income that is obtained from all sources including income from selling of poultry (including egg selling) has statistically significant difference between participants and non-participants at ($p<0.10$).

As indicated in Table 7 the mean annual income of the sampled respondents from livestock (including animal product selling) and poultry (including egg selling) was ETB 1811.1 and 1776.52 respectively. The t-test indicates that there was statistically highly significant difference on the mean annual income from livestock and poultry among poultry market participants and non-participants at ($p<0.01$). This result indicates that households who earned more financial from other sources other than poultry had weak market participation and poultry supply to the market. They may consume the poultry and eggs produced in their home. Whereas most of the farmers who have gotten less financial income from other sources other than poultry used poultry as a source of income and participated in the market and supplied poultry and eggs to the market. Moreover, as an integral part of the mixed farming system, livestock plays great role in the household income source in the study area.

Table 7: Source and income level of sampled households (ETB)

| | Participant | | Non-participant | | Total-sample | | P-value |
|---|---|---|---|---|---|---|---|
| | (N=128) | | (N=72) | | (N=200) | | |
| | Mean | Std | Mean | Std | Mean | Std | |
| Crops | 29.56 | 124.98 | 39.44 | 334.70 | 33.12 | 223.50 | 0.76 |
| Livestock | 1461.80 | 2250.55 | 2432.10 | 1685.2 | 1811.1 | 2112.70 | 0.002*** |
| Off-farm | 2025 | 5313.24 | 2416.67 | 4325.46 | 2166 | 4972.65 | 0.594 |
| Total income | 3516.4 | 5853.3 | 4848.8 | 4551 | 3996 | 798.8 | 0.09* |

Significant Level: ***=1% and *= 10% N=Sample size

Source: Survey result, 2015.

## 4.3 Demographic and Socioeconomic Characteristics of Traders

A total of 29 traders, i.e. 10 collectors, 17 retailers and 2 wholesalers were interviewed. The demographic characteristics of traders summarized in terms of age, sex, marital status and education level of traders (Table 8). The age of traders ranged from 20 to 42 with an average age of 30.6. The survey result indicated that, 27 (93.1%) and 2 (6.9%) of the sampled poultry traders were males and females, respectively. This result indicated that more proportion of males participated in poultry and egg trading than females. About 86% and 13.8% of them were married and single respectively. This result indicated that married persons gave more emphasis for poultry trading than single persons. The reason could be due to matured mind of married persons to improve their livelihood and thinking to ensure the feed security of their family where as single persons gave less emphasis for trading due to the absence of family size and feeling less responsibility. In case of educational status of the traders, about 34.5% and 65.5% of the sample traders were within the level of primary and Secondary school education respectively. This result implied that, poultry trading in the study area was mostly implemented by more educated persons. The average family size of traders was 3.48. As shown in table 8, the average trading experience of traders on poultry and egg trading was 4 years.

Table 8: Demographic characteristics of traders

| **Continuous Variables** | **Mean** | **Std** |
|---|---|---|
| Age of traders | 30.6 | 5.765 |
| Family size of traders | 3.5 | 1.379 |
| Experience of traders | 4 | 2.659 |
| **Dummy Variables** | **Number of traders** | **%** |
| **Sex** | | |
| Male | 27 | 93.1 |
| Female | 2 | 6.9 |
| **Marital status** | | |
| Married | 25 | 86.2 |
| Single | 4 | 13.8 |
| **Education level** (cate.v) | | |
| Grade 5-8 | 10 | 34.5 |
| Grade 9-12 | 19 | 65.5 |

Source: Survey result, 2015. , Cate.v =categorical variable

### 4.4 Demographic Characteristics of Processors and Consumers

As shown in table 9, 12 processors such as cafeterias and restaurant owners were interviewed. They cooked and sold poultry products specially eggs for their customer. Their demographic characteristics were summarized in terms of age, sex, family size, marital status and education level of processors. The age of processors ranged from 22 to 50 with an average age of 36. The survey result indicated that, 33.3% and 66.7% of the sampled processors were males and females respectively. This result indicated that females were more participated in processing poultry products than males. About 83.3% and 16.7% of them were married and single respectively. In the case of educational status of the processors, about 18.7% were illiterate, 25% within elementary school and 58.3% of them were within secondary school completed. This result reflected that poultry product processing was mostly implemented by more educated respondents. The average family size of processors was 4. About 39,400 Birr was

the annual average financial income of processors. The facilities used by processors were cooking materials such as stove, spoon and dish.

As indicated in table 9, the age of consumers ranged from 25 to 65 with an average age of 38.4. Out of 52 consumers, 29 and 23 were males and females respectively. In case of the educational level of consumers 9.62%, were illiterate, 19.24% elementary school, 42.3% secondary school completed, 17.3% diploma and 11.54 degree. This result also indicated that, as education level increases the tendency for poultry consumption increases. The average family size of consumers was 4.56. The annual income of consumers ranged from 6,000 to 144,000with an average of 30,646 Birr. The standard deviation was about 29442.3. This indicated that there was a great difference in financial income among consumers.

Table 9: Demographic characteristics of processors and consumers

| **Continuous variables** | **Processors** | | **Consumers** | |
|---|---|---|---|---|
| | **Mean** | **Std** | **Mean** | **Std** |
| Age | 36 | 8.6598 | 38.44 | 11.563 |
| Family size | 4 | 1.7581 | 4.56 | 1.731 |
| Yearly income | 39,400 | 10484.27 | 30646 | 29442.3 |
| **Dummy variables** | **Number of processors** | **%** | **Number of consumers** | **%** |
| **Sex** | | | | |
| Male | 4 | 33.3 | 29 | 55.77 |
| Female | 8 | 66.7 | 23 | 44.23 |
| **Marital status** | | | | |
| Married | 10 | 83.3 | 50 | 96.14 |
| Single | 2 | 16.7 | 2 | 3.86 |
| **Education** (Cate.v) | | | | |
| Illiterate | 2 | 16.7 | 5 | 9.62 |
| Grade 4-6 | - | - | 10 | 19.24 |
| Grade 7-8 | 3 | 25 | - | - |
| Grade 9-12 | 7 | 58.3 | 22 | 42.3 |
| Diploma | - | - | 9 | 17.3 |
| Degree | - | - | 6 | 11.54 |

Source: Survey study, 2015. , Cate.v =categorical variable

## 4.5 Value Chain Analysis

This part discusses the structure and composition of poultry value chain in the study area. It also describes the function of poultry value chain actors, opportunities and major constraints of poultry production in the study area along with identifying the profit margin of the actors in the chain.

### 4.5.1Value chain mapping

Value chain mapping is the graphic representation of input supply, production functions, processing, trading and consumption with in value chain actors. So, poultry value chain mapping was done to identify the core process, value chain actors and their activities at each stage. It was also performed to understand the characteristics of the chain actors and the relationships among them in the chain; the flow of goods through the chain; employment features; and the destination and volumes of domestic sales. The value chain map (Figure 5) shows the flow of poultry in the chain, activities carried out at each stage of the value chain.

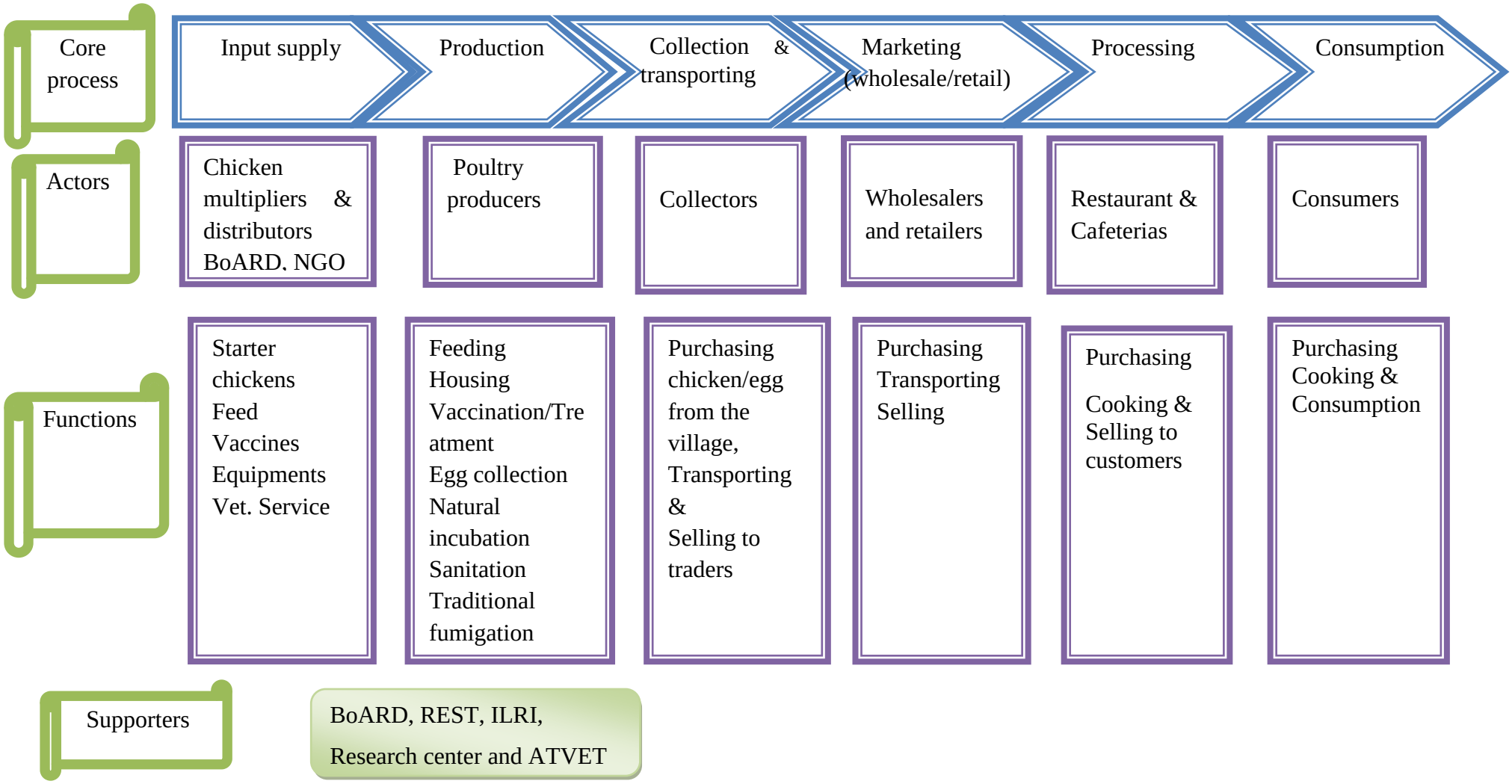



Figure 5: Poultry value chain map
Source: Own computation from the study.

### 4.5.2 Input supply activities and involved actors

In case of input supply, the farmers were asked about the type and continuity and source of poultry inputs the study area. According to the focus group discussion, the types of inputs used by the farmers were local chicken, exotic chicken, feed, hay box chick brooder, incubator and other local materials. According to the key informants, except exotic chicken, hay box chick brooder, incubator and modern medication, the rest of the inputs were available in the study area. The sampled households replied that the common feeds used for their poultry were cereal grains such as maize, sorghum, wheat and barley that are available in their home. They have also responded that office of agriculture and rural development gave them three months old exotic chicken. The main problem occurred in the poultry sector was lack of supervision and regular follow up of the chicken distributed to the farmers. The experts focus on only the distribution of exotic chicken and other inputs. As shown in table 10, about 55.5% and 52.8 % of the participants and non -participants replied that the source of local chicken was from their home respectively. About 36% and 45.8% of the participants and non participants bought the local chicken from the market respectively and about 7% of the participants received as gift from relatives. The source of exotic chicken for 54.7% participants and 15.3% non participants was agriculture office. Only 1.6% and 3.1% of the participants replied that, the source of exotic chicken was market and relatives, respectively. The source of hay box chick brooder for 6.25% of the participant was also agriculture office. About 86.7% of the participant and 33.3% of the non participant used poultry feed from their home while 5.5% and 1.4% of the participant and non participant bought from the market respectively. Market was the source of medication for 15.6% and 1.4% participant and non participant respectively. Agriculture office was the source of medication for 5.5% of the participant. In case of feed trough, about 6.25% and 2.8% of the participant and non participant used locally available materials respectively. About 100% of both participant and non participant also used locally available materials. (Table10).

Table 10: Farmers source of inputs

| Inputs & sources | Participant | Non participant | Total sample |
|---|---|---|---|
| | N=128 | 72 | 200 |
| | % | % | % |
| **Local hen** | | | |
| Own | 55.5 | 52.8 | 54.5 |
| Market | 36 | 45.8 | 39.5 |
| Relatives | 7.0 | 0 | 4.5 |
| No | 1.5 | 1.4 | 1.5 |
| **Exotic hen** | | | |
| Market | 1.6 | 0 | 1 |
| Agriculture | 54.7 | 15.3 | 40.5 |
| Relatives | 3.1 | 0 | 2 |
| No | 40. 6 | 84.7 | 56.5 |
| **Hay box** | | | |
| Agriculture | 6.25 | 0 | 4 |
| No | 93.75 | 100 | 96 |
| **Feed** | | | |
| Own | 86.7 | 33.3 | 67.5 |
| Market | 5.5 | 1.4 | 4 |
| No | 7.8 | 65.3 | 28.5 |
| **Medication** | | | |
| Market | 15.6 | 1.4 | 10.5 |
| Agriculture office | 5.5 | 0 | 3.5 |
| No | 78.9 | 98.6 | 86 |
| **Feed trough** | | | |
| Locally available | 6.25 | 2.8 | 5 |
| No | 93.75 | 97.2 | 95 |
| **Water trough** | | | |
| Locally available | 100 | 100 | 100 |

Source: survey result, 2015.

## 4.5.3 Poultry production system of the study area

### Types of poultry production

Generally, there are 3 types of poultry production systems in Ethiopia such as intensive poultry production system, semi-intensive poultry production system and backyard poultry

production system (as Yami and Dessie (1997), cited in USAID, 2010). There was no intensive poultry production system in the study area. As shown in table 11, about 94.5% and 98.6% of the participants and non participants managed their poultry under backyard production system respectively. About 5.5% and 1.4% of the participants and non participants also managed their poultry under semi-intensive production system respectively. Totally, about 96% and 4% of the producers managed their poultry under backyard and semi-intensive production system respectively. This result indicates that backyard poultry production system was the predominant production system in the study area.

Table 11: Farmer's poultry production system

| Production system | Participant | Non participant | Total sample |
|---|---|---|---|
| | N=128 | 72 | 200 |
| | % | % | % |
| Back yard | 94.5 | 98.6 | 96 |
| Semi intensive | 5.5 | 1.4 | 4 |
| X2 | 74.7*** | | |

Source: Survey result, 2015.

### 4.5.4 Poultry breeds owned by producers

According to the survey study, about 56.5% of the sample farmers had local chicken and 43.5% of them had exotic chicken especially Rhode Island Red in their flock and some white leg horn. In case of the two groups, about 40.6% and 84.7% of the participants and non participants owned local chicken and about 59.4% and 15.3% of the participants and non participants owned exotic chicken respectively (Table12). The purpose of keeping chickens and producing eggs were primarily as source of income and for incubation.

Table 12: Proportion of producers owned poultry breeds

| Breeds | Participant | Non participant | Total sample | p-value | X2 |
|---|---|---|---|---|---|
| | N=128 | 72 | 200 | | |
| | % | % | % | | |
| Local breed | 40.6 | 84.7 | 56.5 | 0.00*** | 34.45 |
| Exotic breed | 59.4 | 15.3 | 43.5 | | |

Source: Survey result, 2015. Significant Level: ***=1%

### 4.5.5 Flock size and breed composition of poultry in the sample household

Flock size and breed composition of poultry in rural and small scale farmers highly depend on the accessibility of input supply, housing system, disease incident and purpose of chicken keeping among producers. In the study area, the total flock size per household ranged from 2-63 with average flock size per sampled household of about 9 which is the total number of local and exotic breeds. As indicated in Table 13, the average number of current flock size of poultry holding of the total sampled respondents for local and exotic breed was 5.69, and 3.37 respectively. The market participants and non-participants had an average of 6.19 and 4.79 local breeds per household respectively. In case of exotic chicken, the participants and non-participants had an average of 4.75 and 0.92 chicken respectively. As presented in Table 13, indicates there was statistically highly significant difference on the mean number of local and exotic poultry breed per household between participants and non-participants at ($p<0.05$) and at ($p<0.01$) respectively.

Table 13: Average current flock size per sampled household (currently available**)**

| | Participant (128) | | Non-participant (72) | | Total-sample (200) | | p-value |
|---|---|---|---|---|---|---|---|
| | Mean | Std | Mean | Std | Mean | Std | |
| **Currently** | | | | | | | |
| Local | 6.19 | 4.45 | 4.79 | 2.52 | 5.69 | 3.92 | 0.0153** |
| Exotic | 4.75 | 9.01 | 0.92 | 3.76 | 3.37 | 7.76 | 0.0007*** |
| Total | 10.94 | 8.97 | 5.71 | 3.58 | 9.06 | 7.89 | 0.0000*** |

Significant Level: ***=1% and **5% N=Sample size

Source: Survey result, 2015.

### 4.5.6 Housing system of village chicken

From the focus group discussion and personal observation, poultry were housed at night in the prepared house but allowed scavenging during the day time in backyard production system. The housing system was mostly not suitable for the poultry. Most of the poultry houses were made up of local materials such as stone, wooden and mud. It was constructed with very small size and short roof and was closed with flat stones at night. All groups of poultry were housed together and suffocation was the common problem in the study area. In addition to that, poultry were over-crowded and exposed to pests. Indigenous chicken were also perched on trees and circumference of the houses which have some woods placed for another purposes. According to the key informants, this production system is characterized by high chick mortality by diseases and predators. According to respondents, poultry reared under this type of production system were more damaged by predators and bad weather condition than the other poultry production systems. Generally, backyard poultry production system resulted in high chick mortality caused by predators and disease. In regard to semi-intensive poultry production system, producers prepared a house made up of corrugated iron sheet and wooden material which was used during the night time. They have used straws on the floor of the house as a bedding material. Farmers prepared a fenced area in front of their permanent houses those were used during the day time for exercise and consume their feeds.

### 4.5.7 Poultry feed and feeding system

Producers in the study area gave small emphasis to poultry when compared with the other animals they owned. In backyard poultry production system, chickens were usually fed a handful of grain in the morning and evening to supplement scavenging. The chickens were moving far from the home to search their feed. Mostly, the farmers fed their chicken only once in the morning and almost all of the feeds were only cereal grains and some leftover feeds that are a source of energy. Even the amount of grain given to the chicken was very small and all groups were given the feed together on the ground. This study revealed that poultry in the rural areas were consuming low quantity and quality of feed. Generally, both the feed and feeding practice were poor and these activities resulted in low poultry

productivity. The watering practice for the chicken was also poor and the water and water troughs used were dirty. As shown in table 14, about 92.2% and 34.7% of the poultry market participants and non participants provided supplementary feed to their chicken respectively. But, about 7.8% and 65.3% of the poultry market participants and non participants did not provide supplementary feed to their poultry. Therefore, among the two groups namely poultry market participant and non participant, there was a significant difference in providing supplementary feed for their chickens at ($p<0.01$). Of the total sampled households, 71.5% of the sampled households provided grains as supplementary feed and 28.5% of them did not provide grains to their chicken. This result indicates that, farmer involved in feed supplementation to the poultry can produce and participate more in the market than those of farmers who did not provide supplementary feed to the poultry.

Table 14: farmers feed supplement to their poultry

| Feed supplement | Participant | Non participant | Total sample | P -value | X2 |
|---|---|---|---|---|---|
| | N=128 | 72 | 200 | | |
| | % | % | % | | |
| Supplement | 92.2 | 34.7 | 71.5 | 0.00*** | 74.67 |
| Not supplement | 7.8 | 65.3 | 28.5 | | |

Significant Level: ***=1%

Source: Survey result, 2015.

### 4.5.8 Disease prevention mechanisms

Discussions with the development agents and agricultural bureau experts revealed that Newcastle disease is the most frequently observed diseases in the study areas. Farmers did not consider that chickens could be infected by disease causing agents found in any dirty and spoiled feeds. Due to this reason, they supplied spoiled and dirty feeds by throwing on the ground.

Among 200 chicken producers, 86% of the farmers had lack of knowledge on modern drugs availability and inadequate resources to seek for veterinary advisory. The remain14% of the

sample households used modern treatment. This indicated that, most of the households in the study area use traditional treatment for infected chicken (Table 15). About 79% and 98.6% of the participants and non participants used traditional treatment respectively. In case of modern treatment, about 21% and 1.4% of the participants and non participants used modern treatment respectively. Moreover, as discussed with the focus group and individual interview, traditional medications such as neem, '*Feto,' 'Areke,' lemon juice, coffee* and *bitter* were given for the chicken in the time of disease outbreak without consultation with veterinary professionals due to lack of getting veterinary service. Existence of traditional knowledge on poultry diseases management are the possible bottlenecks in the sub-sector regarding disease management. The respondents who prepared poultry house replied that they do not have separate day and night time house and chicken spent the whole day elsewhere searching for feed making diseases transmission substantial and severe.

Table 15: Method of disease treatment used by the households

| | Participant | Non participant | Total sample | P-value | X2 |
|---|---|---|---|---|---|
| Treatment type | N=128 | 72 | 200 | | |
| | % | % | % | | |
| Traditional | 79 | 98.6 | 86 | 0.00*** | 14.86 |
| Modern | 21 | 1.4 | 14 | | |

Source: Survey result, 2015.

Most poultry producers in the study area focused on traditional treatments and there was no vaccination and de-worming practices for their chicken even among the farmers who used modern treatments. Except for the little effort made to distribute some exotic breeds as part of the extension package under went in the study area, there were no extension support attached to management, vaccination, treatment and marketing extension services. More exotic chickens died immediately after being distributed to the farmers due to lack of good management and treatment. According to the focus group discussion, all of the farmers require continuous training on poultry management, vaccination and treatment methods.

### 4.5.9 Number of poultry layers holding in the sampled producers

Different households had different number of poultry layers. As indicated in Table 16, the average layer size per sampled respondents for local and exotic breeds were 1.49, and 1.85 respectively. Comparing the groups, poultry market participants and non-participants had an average of 1.69 and 1.13 local layers respectively. In case of exotic layers, the participants and non-participants had an average of 2.76 and 0.22 respectively As presented in Table 16, the t-test indicates that there was statistically highly significant difference between the mean number of local and exotic layers per household between participants and non-participants at ($p<0.01$).

Table 16: Average layers size per sampled household.

| | Participant (N=128) | | Non-participant (N=72) | | Total-sample (N=200) | | P-value |
|---|---|---|---|---|---|---|---|
| | Mean | Std | Mean | Std | Mean | Std | |
| **Layers** | | | | | | | |
| Local | 1.69 | 1.01 | 1.13 | 0.50 | 1.49 | 0.90 | 0.000*** |
| Exotic | 2.76 | 6.94 | 0.22 | 0.63 | 1.85 | 5.69 | 0.002*** |
| Total | 4.45 | 6.99 | 1.35 | 0.72 | 3.33 | 5.80 | 0.000*** |

Significant Level: ***=1% N=Sample size

Source: Survey result, 2015.

## 4.6 Productivity and Profitability of Village Poultry keeping

### 4.6.1 Productivity

The purpose of keeping chicken was mainly for meat and egg productions. Productivity of poultry mainly depends on the poultry production and management system. Productivity of poultry can be compared in relation to the production system. According to the survey result, chickens that received a supplementary feed and good housing were more productive than the chickens that were receiving their feed by scavenging and lack proper housing system.

According to the respondents, the age at first egg was 7.5 months for indigenous chicken and 6 month for exotic chickens. The findings showed that the local birds in the study area reached sexual maturity lately than that of exotic chicken. Gebregziabher (2007) reported that the overall average age at first egg was 7.07 months and ranged from 5-10 months. As shown in table 17, the average production by sampled households was about 24.93 chickens per year and the market participant and non participant households have produced averagely 31.75 and 12.8 chickens, respectively, per year. This indicated that there is highly significant difference on the mean number of chicken produced of local layers and exotic layers per household obtained annually between participants and non-participants at ($p<0.01$). Therefore, this level of production is limited and not as such satisfactory due to different constraints.

Table 17: Number of poultry available and produced per household in 2013/14

| | Participant (N=128) | | Non-participant (N=72) | | Total-sample (N=200) | | P-value |
|---|---|---|---|---|---|---|---|
| | Mean | Std | Mean | Std | Mean | Std | |
| **Currently** | | | | | | | |
| Local | 6.19 | 4.45 | 4.79 | 2.52 | 5.69 | 3.92 | 0.015** |
| Exotic | 4.75 | 9.01 | 0.917 | 3.76 | 3.37 | 7.76 | 0.000*** |
| Total | 10.92 | 8.97 | 5.71 | 3.58 | 9.05 | 7.89 | 0.000*** |
| **Produced** | | | | | | | |
| Local | 17.64 | 11.90 | 11.14 | 4.85 | 15.3 | 10.42 | 0.000*** |
| Exotic | 14.11 | 20.13 | 1.67 | 5.59 | 9.63 | 17.48 | 0.000*** |
| Total | 31.75 | 19.06 | 12.81 | 4.92 | 24.93 | 17.98 | 0.000*** |

Significant Level: ***=1%, and **=5% N=Sample size

Source: survey result, 2015.

## 4.6.2 Level of egg production

The amount of egg produced from one layer per year varies from place to place, which in most cases is determined by the existence of feed source, the level of poultry management and frequency of egg laying. As clearly indicated in table 18, egg production was markedly

different for the indigenous and exotic chickens between participants and non-participants. The total egg produced per sampled household during the study year was about 86 and 260 eggs for the local and exotic layers, respectively. The total egg produced by participant and non participant household during the study year was about 98 and 63 eggs for the local layers, respectively. About 383 and 42 eggs were produced by participant and non participant from exotic layer, respectively. As indicated in table 18, there is highly significant difference between the mean egg produced by local layers and exotic layers per year and between participants and non-participants at ($p<0.01$). High variability in egg production was also observed between poultry market participant and non-participant sample farmers. This is most probably due to differences in management of poultry, and market concern.

Table 18: Amount of egg produced per sampled household in 2013/14

| | Participant (N=128) | | Non-participant (N=72) | | Total-sample (N=200) | | P-value |
|---|---|---|---|---|---|---|---|
| | Mean | Std | Mean | Std | Mean | Std | |
| No. of Layers | | | | | | | |
| Local | 1.7 | 1.0 | 1.1 | 0.5 | 1.5 | 0.9 | 0.0000*** |
| Exotic | 2.8 | 6.9 | 0.2 | 0.6 | 1.9 | 5.7 | 0.0023*** |
| Total | 4.5 | 7.0 | 1.4 | 0.7 | 3.3 | 5.8 | 0.0002*** |
| Egg produced by: | | | | | | | |
| Local breed | 98.2 | 62.4 | 63.0 | 31.3 | 85.5 | 55.9 | 0.0000*** |
| Exotic breed | 382.6 | 643.5 | 42.1 | 125.3 | 260.0 | 544.7 | 0.0000*** |
| Total | 480.8 | 649.4 | 105.0 | 120.9 | 345.5 | 554.2 | 0.0000*** |

Significant Level: ***=1%, N=Sample size

Source: Own survey result, 2015.

As indicated in table 19, the average annual egg production level per hen for both local and exotic layers were 57 and 189 respectively. This indicated that, the level of egg production in the study area generally was very poor and the households reflected that the low level of egg productivity was due to diseases, lack of good housing, poor feed and feeding activities and poor poultry breed type especially the local /indigenous chicken. In case of participants and

non participants, the average annual egg productions per local layer were 58 and 55 respectively. About 189 and 187 eggs were the average annual egg production level of exotic layer in participants and non participants respectively. As indicated in table 19, there is a significant difference in egg productivity of local layer among participants and non participants at less than 10% significance level. Generally, there was no a great difference in annual egg production level among participants and non participants.

Table 19: Average Annual egg production per hen per year by sampled households

| Poultry breed type | Participant (N=128) | | Non-participant (N=72) | | Total-sample (N=200) | | P-value | t-value |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std | Mean | Std | Mean | Std | | |
| Local | 58 | 11.2 | 55 | 6.3 | 57 | 9.7 | 0.06* | -1.87 |
| Exotic | 189 | 48.98 | 187 | 38.3 | 189 | 47.8 | 0.9 | 0.096 |
| Total | 123.85 | 30.1 | 121.7 | 22.3 | 123.25 | 28.75 | | |

Significant Level: *=10%

Source: Survey result, 2015.

## 4.7. Production Constraints and Opportunities

### 4.7.1 Production Constraints

In order to utilize the poultry sub sector, identifying the existing constraints and searching for solutions are of paramount importance. The major constraints that existed in poultry production in the study area has been identified thorough individual interview of producers, focus group discussions and discussions with key informants such as representatives of concerned government and non-government institutions, collectors, processors, retailers, and professionals. As a result, prioritization of the problems was made to identify the most important constraints that hinder the development of poultry sub sector in the study area.

Based on the result of this study, producers suffered from a number of difficulties and challenges that are antagonistic to sustain chick and egg production and marketing. Poultry production problems can affect the chick and egg marketing situations. Therefore, after having identified the major problems facing in the poultry production activities, farmers were

requested to list their priority in order of their severity in poultry production. Table 20 summarizes the ranks of poultry production problems. The results show that primarily, disease, feed and knowledge were the major constraints in poultry production as indicated by all of the producers. According to Zeberga (2010), disease, absence of day and night housing, lack of exotic breed, lack of balanced feed, predation, low finance and lack of awareness were the most important constraints in the study area. Shortage of exotic chicken, lack of good management practices, which leads chicken diseases to spread widely as a result, it increases death rate of chicken in the area (Gebregziabher, 2010).

**Disease**: Disease is among the most important constraints in the production and marketing of village poultry product. As shown in table 20, disease is ranked as the first constraint by the poultry producers. According to the key informants (livestock experts and veterinarians), disease is the most important constraint in the subsector. They also added that *new castle, avian pasterolosis, coccidosis, Salmonellosis, pulorum disease* and *fowl pox* were the most common diseases in the study area.

**Traditional treatment:** Traditional treatment for the infected chickens was the bottleneck problem in the study area. Due to lack of functional extension service to change the attitude of farmers from traditional treatment to modern method of treatment, most of the farmers have used traditional treatments. This method of treatment is not scientifically supported and it was not also effective in curative for the infected chicken in the study area. Out of 200 sampled households, 172 (86%) farmers used traditional treatments for their chicken and the rest 28 (14%) farmers have tried to treat diseased chickens using modern or scientific method of treatment according to the advice given by the veterinarians (Table 15 in above). But this method of treatment lacks continuity and still they also used traditional treatments.

**Lack of balanced feed:** The common feed used for chicken reared under backyard poultry production system was only cereal grains which are a source of carbohydrate. Poultry producers did not consider that chicken need different feeds with different nutritional contents. Even the quantity and quality of grain given to the chicken were not enough to fulfill the requirement of the chicken. In backyard poultry production system, chickens get their feed

by scratching on the ground and small supplement with cereals at home. The main reasons for this constraint were not lack of grain and capital in the producers to formulate balanced feed for their chicken. But, lack of knowhow and attitude in the producers were the reasons for poor nutritional status of chicken. As shown in table 20, lack balanced feed is the second major constraint ranked in poultry production.

**Lack of knowledge:** Table 20 indicated that, lack of knowledge was ranked as the third production constraint. The producers indicated that, they lack knowledge of handling their chicken properly**.** Though producers had long experience in keeping poultry, they did not know the proper poultry management aspects such as disease prevention and treatments mechanisms, types of feeds they need, feeding system, housing and egg handling systems. Farmers in the study area lack know how about the value of sanitation. Due to this reason many farmers miss the benefit that could be obtained from their chicken.

**Poor extension service**: The extension service provided by the wereda's office of agriculture and rural development and NGOs is evaluated in terms of frequency, intensity and type of service given in the study area. Some farmers replied that, the FTCs and extension agents are found around the main roads which are far from their residence. For this reason, all households were not getting extension service due to poor infrastructure and far distance to the FTCs found in each Tabia. About 40% of the sampled households in the study area had no access to extension service provided by office of agriculture and rural development and other NGOs. As shown in table 20, extension was ranked as the forth problem, which affects expanding of poultry production system and number of poultry in the study area. So, continuity and coverage of extension services were the main constraints in poultry production in the study area.

**Poor genetic potential of chicken**: Most of the sampled famers in the study area had only local chickens and some of them owned both local and exotic chicken. About 56.5% of the sampled households had only local chickens and 43.5% of them had both local and exotic chickens. The households who had only exotic chickens were 3.5%. In case of the two groups, about 40.6% and 84.7% of the participants and non participants owned local chicken

and about 59.4% and 15.3% of the participants and non participants owned exotic chicken respectively (Table 12 in the above). This result indicated that, there was lack of improved poultry breed distributed to the farmers. Local chickens have slow growth, low body weight, small egg size, and low yield. As shown in Table20, breed was ranked as the fifth constraint of poultry production by respondent producers. Therefore, it deserves urgent action from the BoARD and NGOs with regard to introduction of improved breed to sustain poultry production and marketing. In short, these problems are technical and management issues and can affect the production and productivity of poultry production in the wereda. Therefore, much focus has to be given to alleviate the described constraints, to tap the maximum potential of the poultry industry.

**Lack of proper housing:** Absence and lack of proper housing were other problems in the study area. Basically, farmers had enough local materials and space to construct poultry houses according to their size and age whereas; they gave very less emphasis for poultry housing. The survey study identified that there was no separate housing for the different groups. The house was common for all groups of chickens and was not with enough floor space and short height. Overcrowding and suffocation were faced on chickens and resulted in chick mortality and poor poultry productivity. Some households did not construct a house for their chicken and predation is also mentioned economically important. As one can see from Table 20, lack of proper housing is ranked as the sixth critical problems that affect poultry production in the study area.

**Predation**: was also the seventh critical problem that affects quantity of chick and egg produced. In addition to the above, finance was also ranked as the eighth problem of poultry production. Therefore, these constraints threat the sustainability of poultry production and marketing.

Table 20: Ranking of major production constraints by poultry producers

| Constraints | Ranking index ratio | Rank |
|---|---|---|
| Disease | 0.28 | 1 |
| Poor breed | 0.21 | 5 |
| Lack of balanced feed | 0.24 | 2 |
| Lack of knowledge | 0.23 | 3 |
| Lack of housing | 0.20 | 6 |
| Shortage of extension service | 0.22 | 4 |
| Predation | 0.193 | 7 |
| Lack of finance | 0.192 | 8 |

Source: Survey result, 2015.

As shown in table 21, about 71.9% and 59.7% of the participants and non participants has ranked disease as the first constraint respectively. Lack of balanced feed and knowledge were the second problems ranked by the 30.5% and 28.1% of the participants and 29.2.5% and 34.6% by non participants respectively.

Table 21: Ranking of production constraints by participants and non participants in %

| Types constraints | Rank of Constraints | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1st | | 2nd | | 3rd | | 4 th and above | |
| | Part. 128 | Non part. 72 | Part. 128 | Non part. 72 | Part. 128 | Non part. 72 | Part. 128 | Non part 72 |
| Disease | 71.9 | 59.7 | 11.7 | 11.1 | 2.3 | 5.6 | 14.1 | 23.6 |
| Breed | 8 | 20 | 1.0 | 5.6 | 3.1 | 4.2 | 87 | 69.4 |
| Feed | 9.4 | 6.9 | 30.5 | 29.2 | 36.7 | 34.7 | 23.4 | 29.2 |
| Knowledge | 9.4 | 7.0 | 28.1 | 34.6 | 29.7 | 26.4 | 32.8 | 32 |
| Housing | 0 | 2.8 | 7 | 5.6 | 7 | 2.8 | 85.2 | 88.8 |
| Ext. service | 2.3 | 4.2 | 22 | 13.88 | 20.3 | 22.2 | 55.4 | 59.7 |
| Predator | 0 | 0 | 0 | 0 | 1.6 | 2.8 | 91.4 | 83.3 |
| Finance | 0 | 0 | 0 | 0 | 0 | 0 | 86 | 91.7 |

Source: Own survey result, 2015.

### 4.7.2 Poultry production opportunities

Village poultry production system is the most profitable economic activity in rural poor households. According to the focus group discussion, backyard poultry production solves different problems of rural poor households especially women. It serves as a starter capital stock, source of income, source of rich protein and also has crucial social and cultural values. Poultry production can be implemented everywhere by using low labor input in the backyard as a source of financial income especially for women and is easier to slaughter in holidays and to special guests compared to other livestock. It needs small area and small starting capital to run poultry farming. Since farmers have their own land, they can produce grains that are used as poultry feed. The distribution of improved poultry breed by bureau of agriculture and rural development is a great opportunity to run poultry production and improve the livelihood of farmers. Now days, in kind credit such as exotic chickens are running by the government to encourage farmers to engage poultry in the backyard. This kind of credit facilitates in utilizing the resource directly to the targeted strategy. In addition to that free vaccination is given by the government. Due to increasing population size and urbanization, demand for poultry and eggs is becoming increased in the study area. As shown in table 22, poultry need small starting capital, poultry need small space and inputs and presence of high demand were ranked by the producers as the $1^{st}$, $2^{nd}$ and $3^{rd}$ opportunities respectively. Good source of human nutrition especially for the poor, fast payback period and good source of income especially for women were also ranked by the producers as the $4^{th}$, $5^{th}$ and $6^{th}$ opportunities respectively. Then availability of grain and good social and cultural values were ranked as the $7^{th}$ and $8^{th}$ opportunities respectively. According to the Gebregziabher (2010), supply of manufactured poultry feed, existence of the necessary ingredients, miller and mixer in the farm, supply of exotic chicken in the near future, high turnover earning, small feed requirement, lower initial cost requirement, employment opportunities for poor women, landless farmers and disadvantaged groups are the production opportunities.

Table 22: Ranking Poultry production opportunities by producers

| Opportunities | Ranking index ratio | Rank |
|---|---|---|
| Need small space and inputs | 0.26 | 2 |
| Need small starting capital | 0.27 | 1 |
| Fast payback period | 0.21 | 5 |
| High demand | 0.23 | 3 |
| Good source of human nutrition | 0.22 | 4 |
| Good source of income | 0.20 | 6 |
| Good social and cultural values | 0.14 | 8 |
| Availability grain | 0.19 | 7 |
| Distribution of exotic chicken | 0.05 | 10 |
| Free vaccination given | 0.06 | 9 |

Source: Survey result, 2015.

## 4.8 Producers Access to Support Services

Value chain supporters or enablers provide support services and represent the common interests of the value chain operators. They remain outsiders to the regular business process and restrict themselves to temporarily facilitating a chain upgrading strategy. Typical facilitation tasks include creating awareness, facilitating joint strategy building and action and the coordination of support activities (like training, credit, input supply, etc). The main supporters of the producers in poultry value chain in the study area were wereda BoARD, Axum research center, LIVES project and REST.

### 4.8.1 Access to credit services

Credit access plays a key role in improving poultry production activities especially for farmers who lack financial resource. This helps to encourage farmers especially women to undertake poultry production activities and earn financial income from poultry production. The credit providers in the study area were governmental and non-governmental organizations. The key informants responded that there were two types of credit services. These were financial and in- kind credit services. In-kind type of credit was established due

to the reason that most farmers used the financial credit to another purposes. This study revealed that some farmers did not require and used credit and some farmers required and used a credit service.

As showed in table 23, about 40% of the sampled respondents had a credit access. About 57.8% and 8.3% of the poultry market participants and non-participants had access to credit service respectively. There is also statistically highly significant difference between the participants and non-participants' in terms of access to credits at ($p<0.01$). This indicated that credit service encouraged farmers to produce and supply poultry to the market. From those who have the access to credit, the major sources of the credit facilities were government organizations and NGOs though government organizations took the higher share in providing the service. However; about 60.0% of the sample respondents have no access to credit for poultry production operations. About 42.2% and 91.7% of the participants and non-participants had not access to credit service respectively. According to the focus group discussion, most farmers have used the credit for purchasing fertilizer, honey bees and other animals. Farmers did not consider poultry keeping and marketing as an independent business and they do not have schedule for poultry keeping and marketing unlike other economic activities.

Table 23: Farmers access to credit

| Groups to be compared | | Credit access | |
|---|---|---|---|
| | | Number | % |
| Participant | Yes | 74 | 57.8 |
| | No | 54 | 42.2 |
| Non-participant | Yes | 6 | 8.3 |
| | No | 66 | 91.7 |
| Total sample | Yes | 80 | 40 |
| | No | 120 | 60 |
| P- value | 0.00*** | | |
| Chi-square | 47.0*** | | |

Significant Level: ***=1%,

Source: survey result, 2015.

### 4.8.2 Access to extension service

Most extension services in the study area are provided by the wereda office of agriculture and rural development. Some NGOs such as REST and LIVES project are also providing extension services in collaboration with wereda office of agriculture and rural development to train farmers on how to manage their chicken, use their resources such as their farm land and other livestock to increase their income and ensure their feed security. In addition to that, the extension service is designed to provide new technology to the farmers to maximize the agricultural production. Today development agents are trained and assigned at each Tabias to assist farmers in all aspects of agricultural activities to improve agricultural productivity and their livelihood. The extension service in the study area is assessed and evaluated based on the frequency of farmers contact with the development agent and the extension service they obtained from the agriculture experts found in the wereda and Tabia. The farmer replied that, intensity extension service in each Tabia was weak. According to the focus group discussion, the extension providers tried to disseminate technologies such as exotic chicken and hay box chick brooder. But there was no close follow up after introducing new exotic chicken to the farmers.

As Table 24 depicts that about 60% of the sampled farmers get extension service and 40% of the farmers did not get extension services for poultry production. Zeberga (2010) found that about 76 and 57 percent of the respondents in Dale and Alaba "special" woredas respectively get extension service for poultry production and marketing in the year 2000EC. Among the groups, 91.5% of participants and 4.2% of non-participants in poultry marketing had access for poultry production extension services. The frequency of the extension services ranged from daily to once a year. About 0.8% and 16.4% of the participants got daily and weekly extension service respectively whereas; about 37.5% and 30.5% of the participants got twice a month and monthly extension service respectively. Generally, there is statistically highly significant difference between participant and non-participants at ($p<0.01$). This result indicated that the farmers that have extension contact can produce poultry and participate in the market than those who have no extension contact. Since, comparing poultry market

participant and non participant, participants had more extension contact than non participant (Table 24).

Table 24: Access to extension service on poultry by sampled households

| Extension service | Participant (N=128) % | Non-participant (N=72) % | Total-sample (N=200) % | P-value | $X^2$ value |
|---|---|---|---|---|---|
| Daily | 0.8 | 0 | 0.50 | | |
| Weekly | 16.4 | 0 | 10.50 | 0.00*** | 156.4 |
| Twice a month | 37.5 | 2.8 | 25 | | |
| Monthly | 30.5 | 1.4 | 20 | | |
| Twice a year | 0.8 | 0 | 0.50 | | |
| Yearly | 5.5 | 0 | 3.50 | | |
| No extension | 8.5 | 95.8 | 40 | | |

Significant Level: ***=1% N=Sample size

Source: Survey result, 2015.

### 4.8.3 Access to market and market information

Most of the sampled farmers in the study area were far from correct market information on the chickens and eggs they produced. As shown in table 25, from the total sample respondents about 48% of the producers received current market information on poultry from different sources and 52% of the producers did not get market information. Compared to poultry market participants and non participants, large proportion of poultry sellers (69.5%) have better access to current and updated market information than non-sellers (9.7%). A study conducted by Zeberga (2010) found that, almost sellers (69%) do not have price information of another market before they transact their produce. According to the survey study, the producers received market information from their friends, neighbors and direct observation in the market. There is also statistically significant difference between the poultry market participants and non-participants' access to current market information at ($p<0.01$). Moreover, the result also depicts that the major source of updated information for farm households or

poultry producers' includes personal observation, other poulty traders, telephone, radio and others farmers.

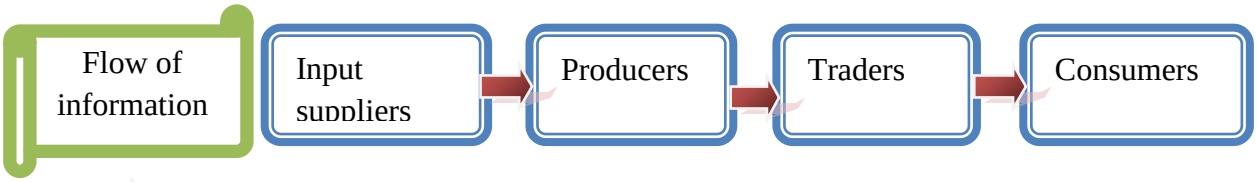
Table 25: Access to market information

| Groups to be compared | **Market information** | | |
|---|---|---|---|
| | | Number | % |
| Participant | Yes | 89 | 69.50 |
| | No | 39 | 30.50 |
| Non-participant | Yes | 7 | 9.70 |
| | No | 65 | 90.30 |
| Total sample | Yes | 96 | 48.00 |
| | No | 104 | 52.00 |
| P-value | 0.00*** | | |
| Chi-square | 66 | | |

Significant Level: ***=1%

Source: Survey result, 2015.

As shown in figure7, flow of information along the poultry value chain actors is only in one direction. There is no forward and back ward flow of information.




NB. ➡ Indicated that the information flow in the study area was in one way direction and the poultry value chain is traditionally implementing.

Figure 6: Flow of information
Source: Survey result, 2015.

## 4.9 Poultry marketing functions and actors

**Producers:** These are the first actors in poultry value chain and participant in poultry market. These are farmers who participated in reproducing and managing chicken for different

purposes such as for cash and household consumption. Poultry producers sell their product to different market actors such as wholesalers, collectors, retailers and consumers.

**Collectors:** collectors play a great role in poultry marketing. The function of these actors was collecting chickens and eggs from rural areas and delivering them to the town. They sell chicken to different traders and consumers.

**Wholesalers**: Whole sellers are traders who purchase and sell large quantities of chicken and eggs to other traders direct to consumers. These whole sellers purchase eggs from collectors and producers and sell in bulk for cafeterias and restaurants. However, there are no chicken wholesalers in the study area but there are egg wholesalers.

**Retailers:** Retailers in chicken and egg marketing chain are those actors who perform the last marketing function by connecting consumers with other traders and producers. The number of these traders varies according to the demand and supply conditions. In the time of holydays the number of retailers reaches its peak and drop as the holyday ends and during fasting days or months.

**Cafeterias and restaurants:** these are value chain actors who purchase poultry and eggs and process for selling the prepared food from poultry products to their customers. Traditional "doro wot," cooked egg are served by cafeterias and restaurants for consumers in most parts of the country. Cooked egg is common in all cafeterias and ''doro wot'' is prepared in some restaurants in the country. In the study area, cooked chicken is not commonly served for selling in restaurants.

**Consumers**: Consumers are the final end points and are the ultimate goal of the production and marketing process and the consideration of whom is central for which the development of the subsector organization comes to reality. Consumer demand is the key for producing and trading chickens and eggs. Poultry consumption is common in the study area especially in public holidays. Consumers get the poultry product through different channels based on their geographic location, the number and size of intermediaries and the number and type of

marketing functions performed by varies marketing agents within the marketing chain. Consumers declare the marketing system is incapable of providing good quality and value added poultry product in the market. The consumers in the study area did not purchase poultry and eggs during the religious fasting periods.

**Number of marketing actors:** According to the traders, there were about 8 licensed and 32 non licensed poultry traders in the study area. The numbers of marketing actors included in the study were about 29 poultry traders, 12 processors and 52 consumers.

### 4.9.1 Relationship among poultry value chain actors

The relationship among poultry value chain actors in the study area was very weak. Most of the actors think only to increase their wealth rather than thinking for mutual benefit. According to the focus group discussion, the main reason for the weak relationship among actors was due to lack of awareness, organization and infrastructure. Egg wholesaler in the study area were somewhat linked with cafeterias and restaurants on the amount and type of eggs needed and the price. According to the cafeterias and restaurant owners, they communicate and agree on price and volume needed using telephone. But, this relationship is informally practicing in the study area. Relationship among the other poultry marketing actors was absent and this indicated that poultry value chain in the study area was weak and more traditional. As shown in figure 7, there was spot market relationship among marketing actors except there were partial relationship between wholesalers and cafeterias and restaurants. There was no persistent market relationship among market actors in the study area.

**Relationship between actors**

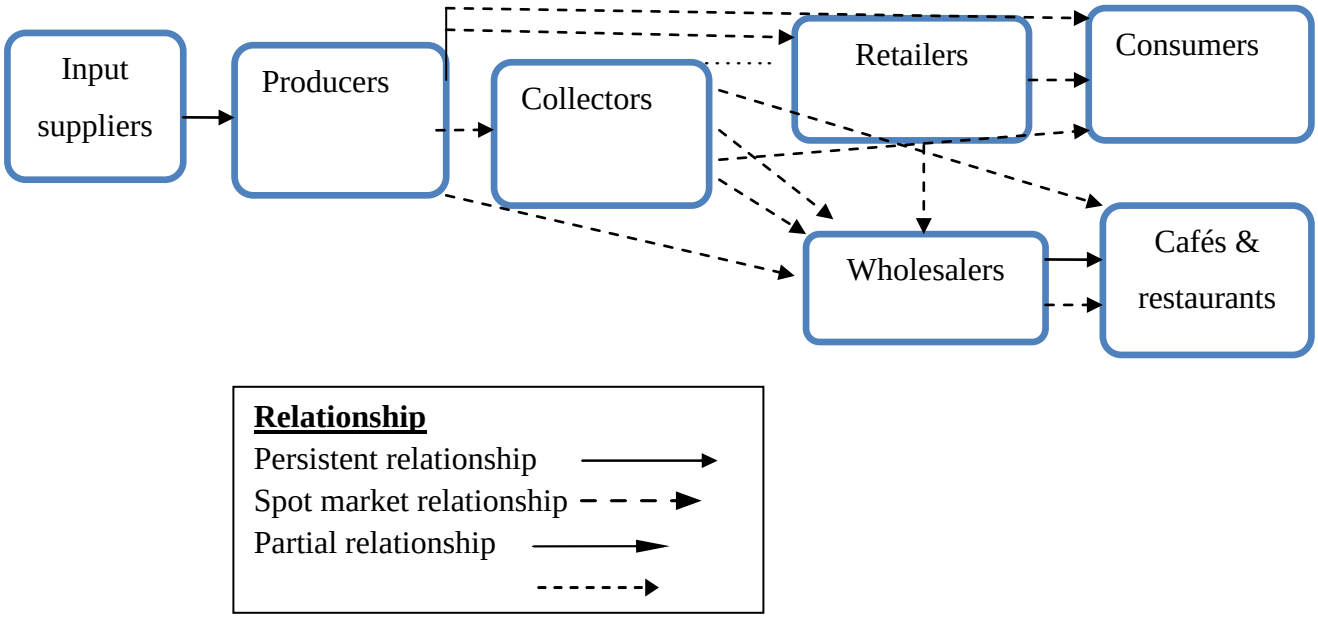



Figure 7: Relationship between actors

Source: Survey result, 2015.

**Spot market relationships:** are relations that are created on the spot that means that actors make a transaction (including negotiation on price and volume agreements) with the duration and scope of that specific transaction. Buyers and sellers meet, come to agreement (or not) and breaking the relationship.

**Persistent market relationship**: when actors have preference for transacting with each other time and time again, we can speak of a persistent net work relation. This comes with a higher level of trust and some level of interdependence and can be formalized by contracts.

**Partial relationship**: It includes a mixed type (spot and persistent) of market relationships.

### 4.9.2 Value addition

Value addition includes any services and activities implemented to produce, transport and process a product. There were different value chain actors who added a value on poultry and its products. Poultry producers in the study area played a great role in adding value on their chickens. The main value addition implemented by the farmers was managing, delivering /transporting poultry and eggs from their home and poultry farms to the market place. The other value adding actors were collectors, retailers, whole sellers and processors. Collectors added a value on poultry by collecting and transporting chickens and eggs from rural areas to the market place. In addition to that wholesalers and retailers also added some value on poultry such as transporting, storing and managing activities especially whole sellers added more. Cafeterias and restaurants also added value by processing eggs for their consumption and selling to the customer. According to the survey study, marketing actors added a selling price for their value addition activities but, most of the farmers did not consider for the value addition they incurred especially for their labor and transport expenses. As shown in Table 26, a total value added along the poultry value chain was Birr 70.8 per chicken. Producers in the study area added 57.4% of the total value added in poultry, which was higher than the value added by collectors and retailers, 28.8% and 13.8% value, respectively.

Table 26: Distribution of value addition in poultry

| Value chain actors | Producers | Collectors | Retailers | Consumers |
|---|---|---|---|---|
| Average Price | 95.3 | 109.5 | 119.5 | |
| Average Cost | 54.7 | 89.10 | 109.7 | |
| Value added | 40.6 | 20.4 | 9.8 | |
| % of value added | 57.4 | 28.8 | 13.8 | |

Total value added=70.8 Birr

Source: Survey result, 2015.

As shown in Table 27, a total of value added along the egg value chain was Birr 0.84 per egg. Producers in the study area added 39.3% of the total value added in egg, which was higher than the value added by collectors, wholesalers and retailers.

Table 27: Distribution of value addition in egg

| Value chain actors | Producers | Collectors | Wholesalers | Retailers | Consumers |
|---|---|---|---|---|---|
| Average Price | 2.03 | 2.30 | 2.44 | 2.52 | |
| Average Cost | 1.70 | 2.15 | 2.2 | 2.40 | |
| Value added | 0.33 | 0.15 | 0.24 | 0.12 | |
| % of value added | 39.30 | 17.85 | 28.55 | 14.30 | |

Total value added= 0.84 Birr

Source: Survey result, 2015.

### 4.10 Analysis of Poultry Market in the Study Area

Marketing is the interaction between different traders and producers in the market. Poultry and eggs were marketed by market actors such as producers, collectors, wholesalers and, retailers in the study area. All poultry producers found in the study area were not participant in the poultry supply to the market. Most of the farmers (64%) supplied chicken and eggs to the market. The poultry marketing system found in the study area was not organized and traditionally implemented. Poultry products are often sold into a crowded and competitive market. A number of farmers are largely isolated from the consumer, and from the demands and preferences of consumers. Chicken and egg are marketed in the open market, on the way and entrance of the town. According to the focus group discussion, producers in the study area sell their chicken and eggs without gaining the correct market prices information. They replied that collectors and retailers cheat them on chicken and eggs price before they enter to the main market. All of the producers also replied that, poultry marketing was very weak and no market actor thought for mutual benefit. This marketing system indicated that there was no strong relationship among the poultry market actors.

#### 4.10.1 Poultry marketing channels

Marketing of poultry generally starts with the collection of poultry from production site and moving on to the wereda towns (Adwa towns). In the marketing chain, the product passes successively through a number of market actors (representing the links in the market chain) before it reaches the end user.

Poultry produced in the study area was channeled to the end users or consumers (Adwa towns) market. The marketing channel was prepared based on the information gathered from traders in different locations. The marketing channel of poultry value chain was conducted by the different value chain actors.

**Poultry marketing channels in the study area:**

Channel I: Producer ➔ Consumers

Channel II: Producer ➔ Retailer ➔Consumer

Channel III: Producer ➔Collector ➔Consumer

Channel IV: Producer ➔Collector➔Retailer ➔Consumer

**Egg Marketing Channels:**

Channel I: Producer ➔ Consumers

Channel II: Producer ➔Retailer ➔Consumer

Channel III: Producer ➔Wholesaler ➔Consumer

Channel IV: Producer ➔Collector➔Consumer

Channel V: Producer ➔Wholesaler ➔ Retailer ➔Consumer

Channel VI: Producer ➔ Collector ➔ retailer➔ consumer

Channel VII: Producer ➔ Collector ➔wholesaler ➔consumer

Channel VIII: Producer ➔Collector➔Wholesaler➔ Retailer ➔Consumer

As can be understood from figure 10, the main receivers of chicken from the farmers were consumers, retailers and collectors with an estimated percentage of 85%, 8.7% and 6.3% respectively.

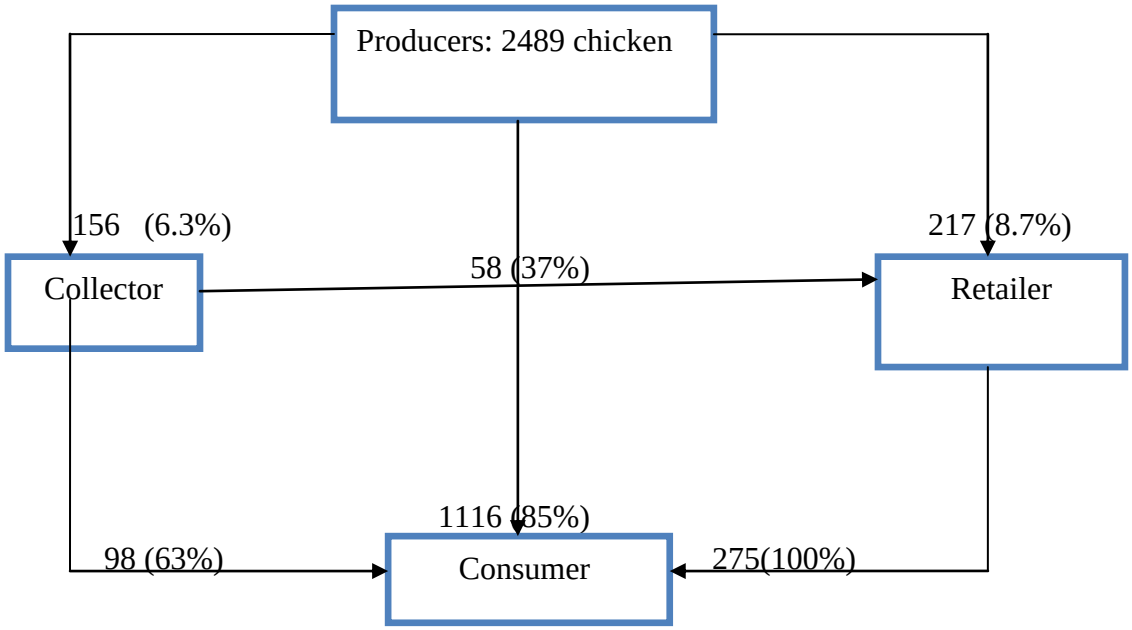



Figure 8: Volume of chicken flow

Source: Survey result, 2015.

In case of egg marketing, consumers, retailers, collectors and wholesalers have received 57%, 16.3%, 10.7% and 10% directly from produces, respectively. This result indicted that producers preferred to sell their product directly to consumers (Fig.11).

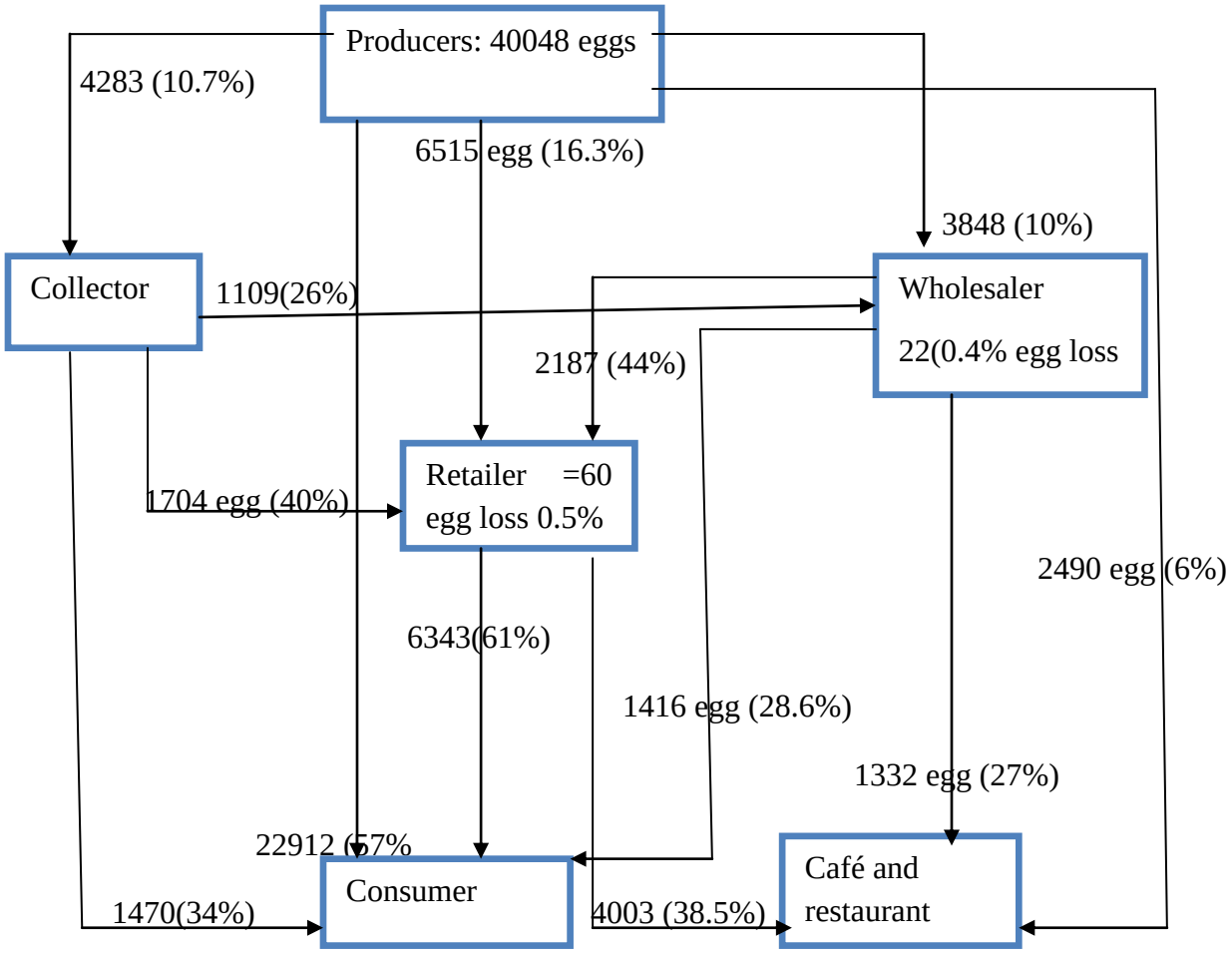



Figure 9: Volume of egg flow

Source: Survey result, 2015.

## Prices of chicken and eggs:

The price of chicken in the study area varied within the different channels. The maximum and minimum selling prices of chicken were 130 and 80 Birr respectively with an average price of 109.40 Birr per chicken. The price of eggs in the study area also varied with the size of eggs and marketing channels. Its price ranged from 1.75 to 3 Birr with an average of 2.34 Birr.

### 4.10.2 Marketing constraints

**Poultry farmers:**

The constraints faced by producers in poultry marketing was far distance to the nearest market or wereda market, lack of transport, low number of chickens, disease, lack of market information, seasonal demand due to fasting months and price fluctuation. In addition to that, there was no organized market linkage among producers and traders. As shown in table 28, long distance to the market, low number of chicken and eggs and lack of market information were ranked by producers as the 1st, 2nd and 3rd market constraints that hinder market participation of farmers respectively. Lack of transport, seasonal demand, and price fluctuation were also ranked as the 4th, 5th and 6th important market problems respectively.

Table 28: Ranking major marketing constraints by producers

| Constraints | Ranking index ratio | Rank |
|---|---|---|
| Distance | 0.27 | 1 |
| Low number of chicken and eggs | 0.31 | 2 |
| Seasonal demand | 0.18 | 5 |
| Lack information | 0.22 | 3 |
| Lack of transport | 0.20 | 4 |
| Price fluctuation | 0.17 | 6 |

Source: Survey result, 2015.

**Poultry traders**:

Poultry and egg traders also had marketing constraints. The main constraints mentioned by the traders were lack of supply, disease, poor and absence of relationship among traders and producers, lack of information exchange, lack of knowledge on identifying healthy chicken and eggs, lack of transport, poor poultry breed, lack of marketing place and lack of credit. The licensed poultry traders replied that there were non- licensed traders who sold their chicken cheaper than their selling price. Since the non licensed traders did not pay a tax and house rent, they have sold their chicken in lower price than those traders who have license and pay tax and

house rent. According to the licensed poultry traders, there was no organized poultry marketing system and was more traditional. As shown in table 29, lack of poultry supply, poor linkage among marketing actors, lack of credit access, lack of market information and presence of non licensed trader were ranked by sample traders as the 1st, 2nd, 3rd, 4th, and 5th major constraints respectively. Poor poultry breed, lack of shade (permanent marketing place), disease outbreak, lack of knowledge and poor transport facility were ranked by the sample poultry traders as the 6th , 7th, 8th, 9th and 10th major problems respectively. In case of poultry breed, they have replied that, some poultry breeds were refused by the consumers due to small size, rough legs and black color which is not attractive. A according to Zeberga (2010), absence of reliable and adequate information on price, shortage of supply were most frequently mentioned constraints in both chicken and egg marketing system.

Table 29: Traders marketing constraints

| Constraints | Ranking index ratio | Rank |
|---|---|---|
| Lack of supply | 0.29 | 1 |
| poor linkage | 0.25 | 2 |
| Disease | 0.207 | 8 |
| Poor breed | 0.209 | 6 |
| Lack of information | 0.221 | 4 |
| Lack of credit | 0.23 | 3 |
| Lack of knowledge | 0.206 | 9 |
| Lack of shade | 0.208 | 7 |
| Lack of transport | 0.205 | 10 |
| Presence of non licensed traders | 0.22 | 5 |

Source: Survey result, 2015.

### 4.10.3 Marketing opportunities

Poultry and egg trading are simple and traders with low capital can run trade easily by using small financial resource. The increasing urbanization and demand of poultry and eggs in the study area makes poultry trade more profitable. According to the traders, poultry trading is less

risky than trading other livestock. Transport access to some rural areas and Adwa town are among the poultry and egg market opportunities. This opportunity does not represent for the whole rural areas but only for the rural areas found around the main roads crossed them. A study conducted by Zeberga (2010) depicted that, less capital and labor requirement, less barriers of entry and exit, high profit margin, high demand and less risk are listed as the marketing opportunities.

### 4.10.4 Economic analysis along the poultry value chain

The performance of poultry market was evaluated by considering associated costs, returns and marketing margins. The marketing cost of chicken and egg trading for varies marketing stages is calculated and shown in Table 30 and 31. In chicken trading, production and marketing costs such as layer cost, feed cost, water trough cost, medication cost, transport cost, labor cost and house rent costs were calculated including opportunity cost in each producer and trader. Layer cost, medication cost, transport cost, labor cost, tax, house rent and others (telephone and losses) were calculated in egg trading. Price of transporting equipment such as basket was added to transport cost of egg trading. Table 30 shows marketing costs and profit margins of chicken in the four channels for each group of market player. Channel I represents direct selling from producers to consumers. Channel II represents selling of chicken from producer to consumer through retailers. Channel III represents selling of chicken from producer to consumer through collectors. The last channel, channel IV represents selling of chicken from producers to consumers through collectors and retailers.

Table 30: Estimated cost and marketing margin of poultry market in channel

| Channel | No. 1 | No. 2 | | No. 3 | | No.4 | | |
|---|---|---|---|---|---|---|---|---|
| | Actor | Actors | | Actors | | Actors | | |
| Cost/return (per unit of product) | Producer | Producer | Retailer | Producer | Collector | Producer | Collector | Retailer |
| **Material cost** | | | | | | | | |
| Hen/depre. cost | 22 | 22 | 104 | 22 | 84 | 22 | 84 | 109 |
| Feed cost | 14.68 | 14.68 | 1.25 | 14.68 | 0.69 | 14.68 | 0.69 | 1.25 |
| Water trough cost | 0.3 | 0.3 | | 0.3 | | 0.3 | | |
| Housing cost | 6.5 | 6.5 | - | 6.5 | - | 6.5 | - | - |
| Medication | 0.18 | 0.18 | - | 0.18 | - | 0.18 | - | - |
| Labor cost | 9.34 | 9.34 | 2.37 | 9.34 | 2.2 | 9.34 | 2.2 | 2.37 |
| **Marketing cost** | | | | | | | | |
| Transport cost | 4.56 | 2.28 | 1.52 | - | 2.2 | - | 2.2 | 0.5 |
| House rent | - | - | 0.52 | | - | - | - | 0.52 |
| Total operating cost | 35.56 | 33.28 | 5.66 | 31 | 5.10 | 31 | 5.10 | 4.64 |
| Total cost | 57.56 | 55.28 | 109.66 | 53 | 89.10 | 53 | 89.10 | 113.64 |
| Selling price | 109 | 104 | 119.75 | 84 | 110 | 84 | 109 | 119.75 |
| Gross profit | 87 | 82 | 15.75 | 62 | 26 | 62 | 25 | 10.75 |
| Value added/Margin | 51.44 | 48.72 | 10.10 | 31 | 20.9 | 31 | 19.9 | 6.11 |
| **NMM (%)** | 47.2% | 40.68% | 8.43% | 26.2% | 19% | 25.90% | 16.6% | 5.10% |

Source: Survey result, 2015.

Producers incur Birr 57.56/chicken as total cost and sold it with Birr 109/chicken to consumers for channel I, 104 for channel II and 84 both for channel III and IV respectively. As shown in table 30, the cost of layer was about 22 Birr in all channels. As compared with other actors in the wereda's poultry value chain, the cost of poultry producers' is much higher and the major share of the operating cost goes to feed cost (41.3%) followed by labor cost (26.3%) and housing cost was the third higher operating cost (18.3%) in channel I. The total cost for channel II was Birr 55.28 and Birr 53 both for channels III and IV. As shown in table 30, 100% and 82.8% of the

margins were taken by the producer in channels I and II respectively. This result indicated that as the channel becomes short the profit share of producers increases

As shown in table 30, the highest contribution of marketing costs in collectors was for labor and transport cost (43.2%) followed by feed cost (13.6). The collector enjoyed 40.3% of the margin in channel III and 34.9% in channel IV. The marketing profit in channels III and IV were Birr 20.9 and 19.9/chicken respectively. The reason to differ the amount of profit was due to the length of the channel. Collectors who have sold poultry directly to the consumers were more profitable than those who sold poultry to the consumers through retailers. With regard to the cost and profitability analysis of the sample poultry retailer's in the wereda, as Table 30 clearly presents, they were found to be profitable. The largest contribution of marketing costs in retailer was for labor (42%) followed by transport cost (26.9% in channel II and labor cost contributed about 51% of the marketing cost followed by feed cost (27%) in channel IV. Retailer took the least margins (17.2% and 10.7% in channels II and IV respectively). This result indicated that a retailer can obtain a profit of Birr 10.10 in channel II and Birr 6.11 per chicken in channel IV which was less than the profit of collectors.

Table 31 represents the market share of actors in poultry marketing in the four channels. The producer's share of the total consumer price was 100% in channel I, 86.8% in channel II, and 76.4% and 70.1% in channels III and IV respectively. This implies that 13.2% of the total consumer price in channel II, 23.6% of the total consumer price in channel III and 29.9% of the total consumer price in channel IV resulted from marketing activities by traders. The collector's share of the total consumer price was 23.6% in channel III and 20.9% in channel IV. The retailer's share of the total consumer price was 13.2% in channel II and 9% in channel IV. As indicated in Table 31 marketing costs, gross profit, marketing margins of chicken traders as a proportion to final consumer price and total channel marketing margin were calculated.

Table 31: Market share of actors in poultry marketing through channels I, II, III and IV

| Channel | No. 1 | No. 2 | | No. 3 | | No.4 | | |
|---|---|---|---|---|---|---|---|---|
| | Actor | Actors | | Actors | | Actors | | |
| Cost/return (per unit of product) | Producer | Producer | Retailer | Producer | Collector | Producer | Collector | Retailer |
| Hen/Chicken cost | 22 | 22 | 104 | 22 | 84 | 22 | 84 | 109 |
| Operating cost | 35.56 | 33.28 | 5.66 | 31 | 5.10 | 31 | 5.10 | 4.64 |
| Total cost | 57.56 | 55.28 | 109.66 | 53 | 89.10 | 53 | 89.10 | 113.64 |
| Selling price | 109 | 104 | 119.75 | 84 | 110 | 84 | 109 | 119.75 |
| Gross profit | 87 | 82 | 15.75 | 62 | 26 | 62 | 25 | 10.75 |
| Net profit | 51.44 | 48.72 | 10.10 | 31 | 20.9 | 31 | 19.9 | 6.11 |
| GMMpcr (%) | 100 | 86.8 | 13.2 | 76.4 | 23.6 | 70.1 | 20.9 | 9 |
| **TGMM (%)** | 0 | 13.2 | - | 23.6 | - | 29.9 | - | - |
| **NMM (%)** | 47.2% | 40.68% | 8.43% | 26.2% | 19% | 25.90% | 16.6% | 5.10% |
| FCP | 109 | - | 119.75 | - | 110 | - | - | 119.75 |

Source: Survey result, 2015.

TGMM= Total gross marketing margin

GMMpcr = market shares of producer, collector and retailer respectively.

NMM=Net marketing margin

FCP= Final consumer price

## 4.10.5 Marketing costs and profitability of egg trading

Table 32 represents marketing costs and profit margins of egg in the eight channels for each group of market players. Channel I represents direct selling from producers to consumers. Channel II represents selling of eggs from producer to consumer through retailer. Channel III represents selling of eggs from producers to consumers through wholesaler. Channel IV represents selling of eggs from producers to consumers through collector. Channel V represents selling of eggs from producers to consumers through wholesaler and retailer. Channel VI represents selling of eggs from producers to consumers through collector and retailer. Channel VII represents selling of eggs from producers to consumers through collector wholesaler the final channel, channel VIII represents selling of eggs from producers to consumers through collectors, wholesalers and retailers.

Table 32: Estimated cost and marketing margin of egg market in each channel

| Channel | No. 1 | No. 2 | | No. 3 | | No.4 | | No.5 | | | No. 6 | | No.7 | | | No. 8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cost/return (per unit of product) | Actor | Actors | | Actors | | Actors | | Actors | | | Actors | | Actors | | | Actors | | | |
| | Producer | Producer | Retailer | Producer | Wholesaler | Producer | Collector | Producer | Wholesaler | Retailer | Producer | Collector | Retailer | Producer | Collector | Wholesaler | Producer | Collector | Wholesaler | Retailer |
| Purchase price | | | 2.12 | | 2 | | 1.98 | | 2 | 2.35 | | 1.98 | 2.37 | | 1.98 | 2.20 | | 1.98 | 2.20 | 2.35 |
| **Material cost** | | | | | | | | | | | | | | | | | | | | |
| Hen cost | 0.24 | 0.24 | | 0.24 | | 0.24 | | 0.24 | | | 0.24 | | | 0.24 | | | 0.24 | | | |
| Feed cost | 0.15 | 0.15 | | 0.15 | | 0.15 | | 0.15 | | | 0.15 | | | 0.15 | | | 0.15 | | | |
| Housing | 0.06 | 0.06 | | 0.06 | | 0.06 | | 0.06 | | | 0.06 | | | 0.06 | | | 0.06 | | | |
| W.trough cost | 0.003 | 0.003 | | 0.003 | | 0.003 | | 0.003 | | | 0.003 | | | 0.003 | | | 0.003 | | | |
| Medication | 0.002 | 0.002 | | 0.002 | | 0.002 | | 0.002 | | | 0.002 | | | 0.002 | | | 0.002 | | | |
| **Market. cost** | | | | | | | | | | | | | | | | | | | | |
| Transport cost | 0.12 | 0.32 | 0.01 | 0.32 | 0.01 | - | 0.1 | 0.32 | 0.01 | 0.01 | - | 0.1 | 0.01 | - | 0.1 | 0.01 | - | 0.1 | 0.01 | 0.01 |
| Labor cost | 0.2 | 0.1 | 0.05 | 0.1 | 0.04 | - | 0.06 | 0.1 | 0.04 | 0.05 | - | 0.06 | 0.05 | - | 0.06 | 0.04 | - | 0.06 | 0.02 | 0.05 |
| House rent | - | - | 0.02 | - | 0.02 | - | - | - | 0.02 | 0.02 | - | - | 0.02 | - | - | 0.02 | - | - | 0.04 | 0.02 |
| Tax | - | - | 0.01 | - | 0.02 | - | - | - | 0.02 | 0.01 | - | - | 0.01 | - | - | 0.02 | - | - | 0.02 | 0.01 |
| Others | - | - | 0.001 | - | 0.01 | - | 0.01 | - | 0.01 | 0.001 | - | 0.01 | 0.001 | - | 0.01 | 0.01 | - | 0.01 | 0.01 | 0.001 |
| Total cost | 0.78 | 0.88 | 2.21 | 0.88 | 2.10 | 0.46 | 2.15 | 0.88 | 2.10 | 2.44 | 0.46 | 2.15 | 2.46 | 0.46 | 2.15 | 2.30 | 0.46 | 2.15 | 2.30 | 2.44 |
| Selling price | 2.17 | 2.12 | 2.52 | 2 | 2.52 | 1.98 | 2.46 | 2 | 2.35 | 2.52 | 1.98 | 2.37 | 2.52 | 1.98 | 2.20 | 2.52 | 1.98 | 2.20 | 2.35 | 2.52 |
| Margin | 1.39 | 1.24 | 0.31 | 1.12 | 0.42 | 1.52 | 0.31 | 1.12 | 0.25 | 0.08 | 1.52 | 0.22 | 0.06 | 1.52 | 0.05 | 0.22 | 1.52 | 0.05 | 0.05 | 0.08 |
| NMM | 64 | 58.5 | 12.3 | 56 | 16.7 | 76.8 | 12.6 | 56 | 10.6 | 3.2 | 76.8 | 9.3 | 3.2 | 76.8 | 2.3 | 8.7 | 76.8 | 2.3 | 2.12 | 3.2 |

Source: Survey result, 2015.

Producers incur Birr 0.78/egg as operating cost and sold it with Birr 2.17/egg to consumers for channel I, 2.12 to retailers for channel II, 2 to wholesaler for channels III and V, 1.98 to collector for channels IV, VI, VII and VIII. As shown in table 32 layer cost was the largest operating cost representing 30.8% followed by labor cost (25.6%) and feed cost contributed about 19.2% of the total operating cost in channel I. Producers were more profitable in channels IV, VI, VII and VIII because they did not incurred marketing costs to sell their eggs to the collector.

As shown in table 32, the highest contribution of marketing costs in collectors was for transport cost (58.8%) followed by labor cost (35.3%). About 5.9% of the marketing was for other costs such as telephone and egg losses. The marketing profit for collectors in channels IV and VI were Birr 0.31 and 0.22 respectively. The marketing profit of collectors was similar both in channels VII and VIII. The reason to differ the amount of profit was due to the length of the channel. Collectors who have sold eggs directly to the consumers were more profitable than those who sold eggs to the consumers through wholesalers and retailers. This result indicated that as the number of traders increase in one channel collector's share of the total consumer price decreases.

With regard to the cost and profitability analysis of the sample egg wholesalers in the wereda, as table 32 clearly presents, they were found to be profitable. The largest contribution of marketing costs in wholesalers was for labor (40%) followed by both house rent and tax (20%). This result indicated that a wholesaler can obtain a profit of Birr 0.42 per egg in channel III, Birr 0.25 per egg in channel V, Birr 0.22 per egg in channel VII and Birr 0.05 per egg in channel VIII. Wholesalers who have bought egg directly from producers and sold directly to consumers were more profitable.

As shown in table 32 the largest contribution of marketing costs in retailers was for labor (55.6%) followed by house rent (22.2%) A retailer has earned a profit of Birr 0.30per egg in channel II, Birr 0.08 per egg in channels V and VIII and Birr 0.06 per egg in channel VI. Retailers who have bought egg directly from producers and sold directly to consumers were more profitable. This result indicated that retailers who have bought egg directly from

producers and sold to consumers were more profitable. Generally, as marketing actors increase in a channel a profit share of traders from the consumer price decreases.

Table 33 represents the market share of actors in egg marketing in the eight channels. The producer's share of the total consumer price was 100% in channel I, 84.1% in channel II, 79.4% in channels III and V, 80.5% in channel IV and 78.6% for channels VI, VII and VIII. This implies that the 15.9% of the total consumer price in channel II, 20.6% of the total consumer price in channels III and V, 19.5% of the total consumer price in channel IV and 21.4% of the total consumer price in channels VI, VII and VIII resulted from marketing activities by traders. In channel IV, the collector's market margin constituted 19.5% of the total consumer price. In addition to that 15.5% of the total consumer price in channel VI and 8.5% of the total consumer price both in channels VII and VIII resulted by collector. The wholesaler's share of the total consumer price was 20.6% in channel III, 13.9% in channel V, 12.7% in channel VII and 6% in channel VIII. The retailer's share of the total consumer price also constituted 15.9% in channel II, 6.7% in channels V and VIII and 5.9% in channel VI.

Table 33: Market share of actors in different egg marketing channels

| Market actors | Cost/profit items | Channels | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | I | II | III | IV | V | VI | VII | VIII |
| Producers | Hen cost | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 |
| | Operating cost | 0.54 | 0.64 | 0.64 | 0.22 | 0.64 | 0.22 | 0.22 | 0.22 |
| | Total cost | 0.78 | 0.88 | 0.88 | 0.46 | 0.88 | 0.46 | 0.46 | 0.46 |
| | Selling price | 2.17 | 2.12 | 2 | 1.98 | 2 | 1.98 | 1.98 | 1.98 |
| | Net profit (ETB) | 1.39 | 1.24 | 1.12 | 1.52 | 1.12 | 1.52 | 1.52 | 1.52 |
| | GMMp (%) | 100 | 84.1 | 79.4 | 80.5 | 79.4 | 78.6 | 78.6 | 78.6 |
| | TGMM (%) | 0 | 15.9 | 20.6 | 19.5 | 20.6 | 21.4 | 21.4 | 21.4 |
| Collector | Purchasing price | - | - | - | 1.98 | - | 1.98 | 1.98 | 1.98 |
| | Operating cost | | | | 0.17 | | 0.17 | 0.17 | 0.17 |
| | Total cost | | | | 2.15 | | 2.15 | 2.15 | 2.15 |
| | Selling price | - | - | - | 2.46 | - | 2.37 | 2.20 | 2.20 |
| | Net profit(ETB) | - | - | - | 0.31 | - | 0.22 | 0.05 | 0.05 |
| | GMMcl (%) | - | - | - | 19.5 | - | 15.5 | 8.7 | 8.7 |
| Wholesaler | Purchasing price | - | - | 2 | - | 2 | - | 2.2 | 2.2 |
| | Operating cost | - | | 0.10 | - | 0.10 | - | 0.10 | 0.10 |
| | Total cost | | | 2.10 | | 2.10 | | 2.30 | 2.30 |
| | Selling price | - | - | 2.52 | - | 2.35 | - | 2.52 | 2.35 |
| | Net profit | - | | 0.42 | - | 0.25 | - | 0.22 | 0.05 |
| | GMMw (%) | - | - | 20.6 | - | 13.9 | - | 12.7 | 6 |
| Retailer | Purchasing price | | 2.12 | | - | 2.35 | 2.37 | | 2.35 |
| | Operating cost | | 0.09 | | - | 0.09 | 0.09 | | 0.09 |
| | Total cost | | 2.21 | | | 2.44 | 2.46 | | 2.44 |
| | Selling price | | 2.52 | | - | 2.52 | 2.52 | | 2.52 |
| | Net profit | | 0.31 | | - | 0.08 | 0.06 | | 0.08 |
| | GMMr (%) | | 15.9 | | - | 6.7 | 5.9 | | 6.7 |
| FCP (Final Consumer Price) | | 2.17 | 2.52 | 2.52 | 2.46 | 2.52 | 2.52 | 2.52 | 2.52 |

Source: Survey result, 2015.

### 4.11 Determinants of Poultry Market participation and its Supply

All of the selected sample households in Adwa wereda keep poultry but not all sell chicken or egg. The Heckman's procedure results for both outcome and selection variables are presented and discussed in the next subsection. Multi co-linearity was checked before running the econometric model for both the continuous and dummy variables. According to Gujarati (2003), multicollinearity refers to a situation where it becomes difficult to identify the separate effect of independent variables on the dependent variable because of existing strong relationship among them. The two measures that are often suggested to test the existence of multicollinearity are Variance Inflation Factor (VIF) and Contingency Coefficients (CC). Variance inflation factor (VIF) was used to check whether there was multi co-linearity or not among the continuous variables. The result obtained through checking variance inflation factor of the variables ranged 1.05- 4.67. As a rule of thumb, if the VIF is greater than 10, the variable said to be highly collinear (Gujarati, 2003). Moreover, contingency coefficient was also computed to check whether there was multicollinearity or not among the dummy or discrete variables. The value ranges between 0 and 1, with 0 indicates no association between the variables and value close to 1 indicating a high degree of association between variables. Hence, multi-co linearity was not a serious problem both among the hypothesized continuous and dummy variables (Appendix Table 1 and 2). Heteroscedasticity was also checked using SPSS16 soft ware to check the degree of homoskedasticity and linear relationship among the variables. So, there was no a serious problem of hetroscedasticity and linearity problem.

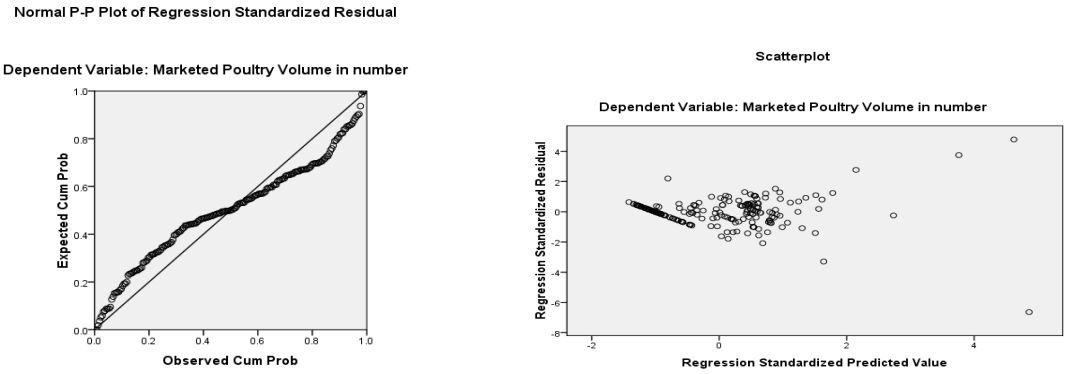



Figure 10: linearity and homoskedasticity

Source: SPSS software package output, 2015.

### 4.11.1 Factors determining poultry market participation decision

In order to examine what factors affect Adwa wereda farmers' decision to sell or not to sell of their poultry in the study area, fifteen variables which are sex of the household head, age of the household head, family size of the household head, education status of the household head, distance to the market, market information, extension service, number of chickens owned, credit access, feed supplement, experience in crop farming, grain availability, off-farm income, type of breed and income from other livestock were the hypothesized variables for poultry market participation decision. Based on the Heckman selection assumption, one variable, which is market information, was included in the participation equation but not in the observation equation. Among the 15 hypothesized variables, four of them (sex, grain availability, number of chickens owned, extension service and distance to the market) have statistically significant influence on market participation decision (Table 34).

**Sex of the household head:** Being female influenced the probability market participation decision of poultry positively and in statistically significant manner at ($p< 0.01$). The most probable reason for this result might be that female-headed households keep poultry, they may have good management practices; this in turn would increase the amount of production. As a result, they may be more likely to participate in poultry market and use the produced chicken and egg for sale. The marginal effect also indicated that, if the household head is female the probability to participate in poultry market increases by 30 percent. Similarly, previous study conducted by Zeberga (2010) found that sex of the household head has a significant and positive relationship with the farmers' market participation decision.

**Grain availability** influenced the probability of market participation decision of poultry negatively and statistically significant at less than 10 percent significance level. Contrary to the expectation grain availability of the household was found to influence market participation decision negatively and significant. The most probable reason for this result might be that even if the households have better grain availability, they may give less attention for feed supplement and they may see the poultry business as minor things; this in turn would increases the death rate. As a result, they may not participate in the poultry production for

market. The marginal effect indicated that, if the grain availability increases by one, the probability to participate in poultry market decreases by 23.3 percent.

**Number of chicken owned** influenced the probability of farmers' poultry market participation decision positively and statistically significant at ($p<0.01$). This could be because of the fact that, the larger the flock size, the more likely the producers sell chicken. The larger the number of chickens owned, the higher the quantity of chicken produced hence the probability of participation in poultry marketing increases and vice versa. The marginal effect also indicated that, if the number of chickens owned increases by one, the probability to participate in poultry market increases by 17.3 percent.

**Access to Poultry Production Extension Service** influences the probability of poultry market participation positively and statistically significant at ($p<0.01$). This can be because of the fact that extension service widens the household's knowledge with regard to the use of improved poultry production technologies and has positive impact on volume of poultry marketed and also extension visits improves the household's intellectual capitals or knowledge concerning poultry production system particularly relating to modern poultry production, management and handling methods, which improves poultry production and increases the amount of chicken and egg production hence the participation in poultry marketing. Furthermore, the marginal effect shows that, the probability that poultry producers those who received extension services participate in poultry market increases by 32 percent.

**Distance to nearest market** as expected influences the probability of market participation decision negatively and statistically highly significant at ($p< 0.01$). The most probable reason for this result could be that households, which are far away from wereda market, incur high transportation and other related costs. Incurring high transportation and other related costs due to long distance to market will discourage them to participate in the market. The marginal effect also indicated that as the distance to wereda market increases by one kilometer the probability to participate in poultry market decreases by 38.3 percent. This is in line with Gebregziabher (2010).

Table 34: Heckman selection Model (two-steps) estimates of poultry market participation

| Variable | Coefficient | Marginal effects | P-value |
|---|---|---|---|
| Cons | -3.362 | | 0.272 |
| SEXHH | 0.297*** | 0.297 | 0.007*** |
| AGEHH | 0.059 | 0.059 | 0.351 |
| FAS | 0.214 | 0.214 | 0.219 |
| EDHH | 0.093 | 0.093 | 0.317 |
| YEF | 0.056 | 0.060 | 0.350 |
| Grain availability | -0.232* | -0.232 | 0.078* |
| OI | 0.00003 | 0.00003 | 0.752 |
| FIOLS | -0.0002 | -0.0002 | 0.241 |
| FS | 0.613 | 0.613 | 0.341 |
| BT | -0.115 | -0.115 | 0.847 |
| No. chicken owned | 0.173*** | 0.173 | 0.003*** |
| Access to extension | 0.316*** | 0.316 | 0.003*** |
| AC | -1.111 | -1.111 | 0.240 |
| MI | 0.074 | 0.074 | 0.917 |
| Distance to market | -0.383*** | -0.383 | 0.007*** |

Source: Survey result, 2015.

### 4.11.2 Factors affecting the amount of poultry supply to the market

In the second stage of Heckman model, fourteen variables were hypothesized to influence volume of poultry marketed. These variables were sex of the household head, age of the household head, family size of the household head, education status of the household head, distance to the nearest market, extension service, number of chickens owned, credit access, feed supplement, experience in crop farming, grain availability, off-farm income, type of breed and income from other livestock. Out of these, four variables were found to be the factors which determine the volume of poultry market surplus by poultry producers significantly (Table 35).

**Type of poultry breed** influenced the volume of chicken supply to the market negatively and statistically significant at ($p<0.10$) significance level. This can be explained as farmers possessing exotic breed produce lower volume of chicken than those who use the local one. This could be due to the reason that exotic chicken are sensitive to diseases and could not incubate their eggs to hatch chicks by their nature as local breeds do. The less they produce, the less they tend to supply poultry to the market. As indicated in Heckman selection model(two-steps) estimates of value of poultry sales (Table 35), at the same time as a poultry producers gets one more unit of exotic poultry breed leads a 3.8 value decreased in the quantity of chicken supplied to the market being other variables held constant.

**Number of poultry/chicken Owned** by the household influences the volume of poultry sale positively and statistical significant at ($p<0.01$). This indicates that farmers with more number poultry can produce more volume of chicken and egg and not only having of better marketable surplus but will able to sell in bulk and create an opportunity to the producers to negotiate for better prices as well as contracts with major buyers in which case therefore, are assured of a constant market. A unit increase in the number of poultry owned will lead a 0.42 increment in the value of poultry sales being other variables held constant.

**Access to Poultry production Extension service** as expected influences poultry marketed volume positively and statistically significant at ($p<0.05$). This can be because of the fact that extension service widens the household's knowledge with regard to the use of improved poultry production technologies and has positive impact on volume of poultry marketed and also extension visits improves the household's intellectual capitals or knowledge concerning poultry production system particularly relating to modern poultry production, management and handling methods, which improves poultry production and increases the amount of chicken production. Furthermore, the coefficient shows that, poultry producers those who received poultry production extension services supply 11.27 number of more poultry than those who didn't receive extension services. This study is in line with Abebe (2009).

**Distance to nearest or wereda market** also significantly at ($p<0.01$) and negatively affects the volume of poultry sold. In relation to this, market accessibility by the producer households

can also be vital for boosting value of poultry sale. Moreover, the estimation result (Table 35) shows that distance to markets is inversely related to the volume of chickens marketed from the chicken keeping activity. The most probable reason for this result could be that households, which are far apart from nearest market, incurred high transportation and other related costs will discourage them to supply large number of chicken to the market. The coefficient of estimation of volume of poultry sold with respect to distance to markets indicate that a 1 km increase in distance to markets leads to a 1.05 number reduction in the volume of poultry sales being other variables held constant. A study conducted by Tadesse (2012) states that those households closer to markets benefited from higher farm gate prices and vital information concerning prices, which contributes to earn higher farm income.

Table 35: Heckman selection Model (two-steps) estimates of value of poultry sales

| Variable | Coefficient | Stan.error | P-value |
|---|---|---|---|
| Cons | 8.114 | 11.755 | 0.490 |
| SEXHH | 3.289 | 2.239 | 0.142 |
| AGEHH | -0.175 | 0.212 | 0.410 |
| FAS | 0.069 | 0.696 | 0.921 |
| EDHH | -0.149 | 0.288 | 0.604 |
| YEF | 0.228 | 0.197 | 0.247 |
| Grain availability | -0.118 | 0.379 | 0.757 |
| OI | -0.00018 | 0.0002 | 0.389 |
| FIOLS | 0.00016 | 0.0004 | 0.706 |
| FS | 2.132 | 3.742 | 0.569 |
| BT | -3.839* | 2.092 | 0.067* |
| No. of chicken owned | 0.423*** | 0.049 | 0.000 *** |
| Extension service | 11.269** | 4.685 | 0.016 ** |
| AC | 1.234 | 1.98 | 0.534 |
| Distance to market | -1.046*** | 0.365 | 0.004*** |
| Lambda | 9.85576 | | 0.037** |
| rho($\rho$) | 1.000 | | |
| Sigma | 9.85576 | | |

Wald chi2 (28) = 138.06 Prob > chi2 = 0.0000

Source: Survey result, 2015.

Rho($\rho$) is the correlation between the error terms of the substantive and selection models. Rho has a potential range between -1 and +1 and can give some indication of the likely range of selection bias. A correlation with an absolute value of 1 would occur if the regression coefficients of the selection model and the regression coefficients of the substantive model were estimated by identical processes (i.e., potential selection bias). Conversely, a value of rho closer to zero would suggest that data are missing randomly or the regression coefficients

of the selection model and the regression coefficients of the substantive model were estimated by unrelated processes (i.e., less evidence of selection bias) (Cuddeback *et al*.,2004).

**Inverse Mill's ratio (LAMBDA):** The inverse Mill's ratio had positive relation with the volume of poultry surplus to the markets and significant at ($p<0.05$) and it confirms that in Heckman two-stage model, the correction for selectively bias is significant. This result suggests that there appears to be no unobserved factors that might affect both probability of producers market entry decision and marketable supply.

### 4.11.3 Factors determining egg market participation decision

To observe the factors mainly affect farmers' decision to sell or not to sell of their egg in the study area, fifteen variables which are sex of the household head, age of the household head, family size of the household head, education status of the household head, distance to the market, market information, extension service, number of chickens owned, credit access, feed supplement, experience in crop farming, grain availability, off-farm income, type of breed and income from other livestock were the hypothesized variables for egg market participation decision. Among the 15 hypothesized variables, four of them (sex, grain availability, number of chickens owned, extension service and distance to the market) have statistically significant influence on market participation decision (Table 36).

**Sex of the household head:** Being female influenced the probability market participation decision of egg positively and in statistically significant manner at ($p< 0.01$). The most probable reason for this result might be that female-headed households keep poultry, they may have good management practices; this in turn would increase the amount of egg production. As a result, they may be more likely to participate in egg market and use the produced egg for sale. The marginal effect also indicated that, if the household head is female the probability to participate in poultry market increases by 29.7 percent. Similarly, previous study conducted by Zeberga (2010) found that sex of the household head has a significant and positive relationship with the farmers' market participation decision.

**Grain availability** influenced the probability of market participation decision of egg negatively and statistically significant at less than 10 percent significance level. Contrary to the expectation grain availability of the household was found to influence market participation decision negatively and significant. The most probable reason for this result might be that even if the households have better grain availability, they may give less attention for feed supplement and they may see the poultry business as minor things; this in turn would increases the death rate. As a result, they may not participate in the egg production for market. The marginal effect indicated that, if the grain availability increases by one the probability to participate in egg market decreases by 23.3 percent.

**Number of chicken owned** influenced the probability of farmers' egg market participation decision positively and statistically significant at ($p<0.01$). This could be because of the fact that, the larger the flock size, the more likely the producers produce and sell eggs to the market. The larger the number of chickens owned, the higher the quantity of eggs produced hence the probability of participation in egg marketing increases and vice versa. The marginal effect also indicated that, if the number of chickens owned increases by one the probability to participate in egg market increases by 17.3 percent.

**Access to Poultry Production Extension Service** influences the probability of egg market participation positively and statistically significant at ($p<0.01$). This can be because of the fact that extension service widens the household's knowledge with regard to the use of improved poultry production technologies and has positive impact on volume of egg marketed and also extension visits improves the household's intellectual capitals or knowledge concerning poultry production system particularly relating to modern poultry production, management and handling methods, which improves poultry production and increases the amount of egg production hence the participation in egg marketing. Furthermore, the marginal effect shows that, the probability that poultry producers those who received extension services participate in egg market increases by 31.6 percent.

**Distance to nearest market** as expected influences the probability of egg market participation decision negatively and statistically highly significant at ($p< 0.01$). The most

probable reason for this result could be that households, which are far away from wereda market, incur high transportation and other related costs. Incurring high transportation and other related costs due to long distance to market will discourage them to participate in the market. In addition to that travelling long distance to sell eggs may be very tiresome for the farmers. The marginal effect also indicated that as the distance to wereda market increases by one kilometer the probability to participate in egg market decreases by 38.3 percent. This is in line with Gebregziabher (2010).

Table 36: Heckman selection Model (two-steps) estimates of egg market participation

| Variable | Coefficient | Marginal effects | P-value |
|---|---|---|---|
| Cons | -3.362 | - | 0.272 |
| SEXHH | 0.297*** | 0.297 | 0.007*** |
| AGEHH | 0.059 | 0.059 | 0.351 |
| FAS | 0.214 | 0.214 | 0.219 |
| EDHH | 0.093 | 0.093 | 0.317 |
| YEF | 0.056 | 0.060 | 0.350 |
| Grain availability | -0.232* | -0.232 | 0.078* |
| OI | 0.00003 | 0.00003 | 0.752 |
| FIOLS | -0.0002 | -0.0002 | 0.241 |
| FS | 0.613 | 0.613 | 0.341 |
| BT | -0.115 | -0.115 | 0.847 |
| No. chicken owned | 0.173*** | 0.173 | 0.003*** |
| Access to extension | 0.316*** | 0.316 | 0.003*** |
| AC | -1.111 | -1.111 | 0.240 |
| MI | 0.074 | 0.074 | 0.917 |
| Distance to market | -0.383*** | -0.383 | 0.007*** |

Source: Survey result, 2015.

### 4.11.4 Factors affecting the amount of egg supply to the market

Fourteen variables were hypothesized to influence volume of egg marketed in the second stage of Heckman model. These variables were sex of the household head, age of the household head, family size of the household head, education status of the household head, distance to the nearest market, extension service, number of chickens owned, credit access, feed supplement, experience in crop farming, grain availability, off-farm income, type of breed and income from other livestock. Out of these, six variables were found to be the factors which determine the volume of egg market surplus by poultry producers significantly (Table 37).

**Age of the household head:** Influenced the volume of egg sale negatively and statistically significant at ($p<0.01$) significance level. The aged household could stay at home and produce more eggs than less aged. But, the negative result could be because of the fact that, aged households cannot travel long distance and supply eggs to the market. A unit increases in the age of household will lead a 22 decrease in the value of egg supply to the market being other variables held constant.

**Education level of the household head:** Education has a positive effect on egg sale quantity per household per year. It is statistically significance at less than 10% significance level. The model output verifies that, one additional formal year education level leads to the poultry producing household to increase yearly egg production by 20.3 in number. This is in line with Abebe (2009). In fact, educated household can know and improve the nutritional status of the family by consuming the produced eggs at home. But, the positive and significant relationship indicates that, education improves the household ability to acquire new idea related to poultry production and market information, which in turn improves egg productivity and thereby increase marketable supply of eggs.

**Years of experience in farming:** Contrary to the expectation, it influenced the volume of egg sale positively and statistically significant at ($p<0.05$) significance level. This could be because of the fact that farmers having more farming experience can produce more grain and this grain can serve as feed supplement for the poultry. As a result, the poultry can increase

their egg productivity due to feed supplement. A unit increase in one year of farming experience of the household will lead an 18.4 value increment in the quantity of egg supplied to the market being other variables held constant.

**Breed type:** Influenced the volume of egg sale positively and statistically significant at ($p<0.10$) significance level. This can be explained as farmers possessing exotic breed produce higher volume of egg than those who use the local one and the more they produce, the more they tend to supply eggs to the market. As indicated in Heckman selection model(two-steps) estimates of value of egg sales (Table 35), at the same time as a poultry producers gets one more unit of exotic poultry breed results to 145.12 value increment in the quantity of egg supplied to the market being other variables held constant.

**Number of chicken owned** by the household influenced the volume of egg sale positively and statistically significant at ($p<0.01$) significance level. This could be because of the fact that farmers with more number poultry can produce more volume of egg and not only having of better marketable surplus but will able to sell in bulk and create an opportunity to the producers to negotiate for better prices as well as contracts with major buyers in which case therefore, are assured of a constant market. This is in line with Gebregzabher (2010). A unit increase in the number of poultry owned leads to an 11.4 increment in the value of egg supplied to the market being other variables held constant.

**Access to credit service** Credit access for poultry production also has positive influence on volume of egg sold and statistically significant at less than 5%. This is in line with Mesfin, (2012). This could be because of the fact that if the poor households get a credit access especially in-kind credit, they can be encouraged to rear chicken and produce more eggs. As a result, they tend to supply eggs to the market and at the same time as a poultry producers get a credit for one more chicken (in-kind credit) results to 185.7 value increment in the quantity of eggs supply to the market being other variables held constant.

Table 37: Heckman selection Model (two-steps) estimates of value of egg sales

| Variable | Coefficient | Stan. Error | P-value |
|---|---|---|---|
| Cons | 497.03 | 472.04 | 0.29 |
| SEXHH | -16.376 | 89.078 | 0.854 |
| AGEHH | -22.022*** | 8.415 | 0.009*** |
| FAS | -4.808 | 28.033 | 0.864 |
| EDHH | 20.349* | 11.449 | 0.076* |
| YEF | 18.427** | 7.833 | 0.019** |
| Grain availability | 1.018 | 15.122 | 0.946 |
| OI | 0.011 | 0.008 | 0.168 |
| FIOLS | 0.0269 | 0.017 | 0.108 |
| FS | -42.139 | 153.998 | 0.784 |
| BT | 145.118* | 83.213 | 0.081* |
| No. of chicken owned | 11.399*** | 1.961 | 0.000 *** |
| Extension service | -58.263 | 187.224 | 0.756 |
| AC | 185.680** | 77.993 | 0.017** |
| Distance to market | -11.862 | 14.548 | 0.415 |
| **Lambda** | 19.619 | 210.629 | 0.926 |
| **rho($\rho$)** | 0.50 | | |
| **sigma** | 385.7 | | |

Wald chi2 (28) = 125.19 Prob > chi2 = 0.0000, N=200

Source: Survey result, 2015.

# 5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Summary

The study aimed at analyzing value chain of poultry in Adwa wereda, central zone of Tigray. The specific objectives were to map poultry value chain functions, to determine the profit margin of actors along the poultry value chain, to identify factors that determine poultry market participation decision and its supply to the market and to identify major constraints and opportunities along poultry value chain. The data were collected from 200 poultry producer households using structured and semi-structured questionnaire and checklist. The households were selected from four potential poultry producing Tabias of the wereda namely Endamariam shewito, Betehanes, Wedikeshi and Debregenet. Twenty nine traders and twelve processors from Adwa town were also interviewed using the pre-tested questionnaire developed for traders.

The analysis was made using descriptive statistics and econometric model using SPSS and STATA software. Value chain mapping was also employed to map poultry value chain functions. Out of the 200 sampled households, 64% of the poultry producers were market participants while 36% of the producers were non participants in poultry marketing. Market participation decision and volume of poultry and egg sales were found to be important elements in the study of poultry value chain. Therefore, Heckman selection model was used to identify factors determining market participation decision and volume of sales in the study area. The main findings of this research are summarized as follows.

Of the 200 interviewed poultry producing households, 71% are male-headed and the rest 29 % were female-headed households. About 43.98 years was the average age of the sampled poultry producers. These sampled households were randomly selected from each Tabia according to proportionate to size. The average family size of producers was 5.5 and the overall educational status of was 46% illiterate and 54% literate. Of the literate producers, 38% of them were elementary school completed, 15% and 0.50% of them were secondary

school completed and diploma graduated respectively with statistically highly significant between poultry market participants and non participants. The major prevalent diseases identified by the sampled households and key informant were, *new castle, avian pasterolosis, coccidosis, Salmonellosis, pulorum disease* and *fowl pox.* Limited supply of exotic chicken, lack of extension contact, poor feeding and housing system were the other problems identified by the sample households.

Poultry value chain analysis of the study area revealed that, the main actors in the chain were input suppliers, producers, collectors, wholesalers, retailers, processors and consumers. The market channel of egg and chicken shows short route. Significant amount of chicken and egg were channeled through the first channel, direct selling of the commodities from farmers to consumers. In the study area egg wholesalers are very few since most of the time the farmers themselves sale their eggs directly to next actors such as retailers, processors and consumers. The market channel shows that the area has four poultry marketing channels and the major share of poultry marketing goes to channel I (producer to consumer, 100%). This indicated that farmers prefer to sell their product directly to consumers. Regarding the costs of the chain actors, producers in the study area incurred Birr 35.26/chicken as operating cost which is the largest cost compared to other actors. Collectors in the study area enjoy a profit of 20.9 Birr/chicken in channel III and 19.9 in channel IV. This high profit was due to the reason that collectors purchased chicken with cheap price in the village. As number of actors in one channel increases profit of each market actor decreases.

Results obtained from the first stage of the model indicated that sex of the household head, number of chickens owned by the household and extension contact were the variables that influence the decision to participate both in poultry and egg market positively while distance to the wereda market and grain availability were the variables found to be influence the decision to participate both in poultry and egg market negatively. Results from second stage of the model shows that, two variables, number of chickens owned and access to extension contact were found to be significantly influence the volume of poultry sold by the market participants positively while two variables, distance to the wereda market and type of poultry breed were found to be significantly influence volume of poultry sold by the participants of

poultry and marketing negatively. Results from second stage of the model also shows that, five variables, number of chickens owned, access to credit, breed type, education and years of experience in farming were found to be significantly influenced the volume of egg sold by the market participants positively while one variable, age of the household head was found to be significantly influence volume of egg sold by the market participants negatively.

## 5.2 Conclusions

The whole poultry value chain map in the study area shows very weak and is more traditional. The linkage among producers, traders and consumers is weak because, there is no strong forward and back ward flow of information for mutual benefit. The dominant channel in the study area connects suppliers and consumers directly. Large volume of chicken and eggs were supplied directly from producers to consumers. This situation makes the channels very short. Collectors who have sold poultry directly to the consumers were more profitable than those who sold poultry and eggs to the consumers through retailers. This is due to the reason that they bought chicken and eggs in cheap price from farmers and sold it directly to the consumers. Market actors in chicken marketing channel were producers, collectors, retailers and consumers. While the market actor in egg marketing channel were producers, collectors, wholesalers, retailers and consumers. Profit margin of market actors at different channels was calculated and farmer who sold their product directly to consumers got higher market share of the consumer price. As the length of the channel increases, profit share of market actors decreases and other members get more advantage than poultry producers.

Determinants of farmers participation decision in the supply of chicken and eggs to the market and intensity of the volume of supply was analyzed and key determinant factors were identified. The sample poultry producers were grouped as market participants and non participants. From the variables hypothesized to influence market participation decision, sex of the household head, number of chickens owned extension contact and distance to wereda market were significantly influencing the market participation decision of poultry and eggs. From the variables that were expected to affect poultry supply, number of poultry owned access to extension contact, distance to the wereda market and type of poultry breed were

found to influence the value of poultry sales. From the variables that were expected to affect value of egg sales, number of poultry owned, access to credit, breed type, education status and age of the household head were found to influence egg supply to the market.

The problems identified by the sampled households were poultry diseases prevalence, lack of extension service, poor feeding and housing system and lack of exotic chicken input. Lack of permanent market place for egg and chicken traders, seasonal demand, lack of poultry and egg supply in the market and not considered license as one entry barrier element in the sample markets were some of the identified problems by traders.

## 5.3 Recommendations

**Veterinary service**: It is crucial to forward policy directions based on the findings of the study to formulate strategies and intervene from the most appropriate edge of the chain. Based on this understanding the following recommendations have been made. Poultry producers replied that the most common problem of poultry production was disease, which can kill the flock of chicken at a time. Now a day, veterinary experts are small in number and assigned in the wereda but; chicken are mostly produced by the farmers in rural areas. Therefore, these veterinarians cannot give a full service to the whole producers. Almost all of the farmers have used traditional method of treatment for their infected chickens and is not effective in curative. To solve this problem, establishment of veterinary service center by the government and others near to the producers is essential.

**Improved breed**: The other production problem was limited number of exotic chicken distributing in the study area. Most of the sampled households were interested to introduce and keep exotic chicken but they were given small in number. The non participants should be encouraged to participate in the market by introducing improved poultry breeds. Therefore, collaboration of different stakeholders, such as input suppliers, research and extension groups, NGOs, policy makers and other actors interested in poultry production development are required to solve this problem.

**Poultry management**: Poultry management aspects such as housing and feeding systems were among the production problems in the study area. Farmers give less emphasis for poultry management aspects and considered it as a part time work. Training is prominent to change farmer's knowledge, skill and attitude on how to manage their chicken in the backyard and give emphasis for poultry keeping as a source of income. Therefore, collaboration of any interested body can solve this problem.

Poor infrastructure and high transport cost also influence market participation decision negatively. The negative relationship of the variable on market participation decision can be explained as, as the distance is closer to the wereda market the lesser would be the transport and other related costs incurred in the process of marketing. Therefore, government and non-governmental organizations can play their role in providing recommended solutions for this problem. To solve this problem, improving infrastructure in the areas is necessary to reduce transportation and other related costs resulted from distance to poultry market.

Market linkage creation activities should be made by any interested body to develop strong poultry value chain in the study area. Direct connection of producers and consumers should be created to minimize the large margin swallowed by the middlemen.

Seasonal demand and regularity of poultry market are also the market problems in the study area especially during the fasting months. Due to this reason, poultry marketing was not regularly functioning. To solve this problem an intervention by any interested body, government and NGOs should be made by establishment and promotion of chain actors involved in the physical marketing function of processing that adds value to the product by changing the form of the product and helps the establishment of regular demand in market places.

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# 7. APPENDICES

Appendix Table 1: VIF for multi co-linearity diagnosis of continuous variables

| Variable | VIF | 1/VIF |
|---|---|---|
| **AGEHH** | 4.67 | 0.214316 |
| **YEF** | 4.54 | 0.220471 |
| **GA** | 1.74 | 0.576231 |
| **EDHH** | 1.59 | 0.629589 |
| **FAS** | 1.53 | 0.654892 |
| **OI** | 1.24 | 0.805848 |
| **NCHO** | 1.15 | 0.872671 |
| **DNM** | 1.10 | 0.907398 |
| **FIOLS** | 1.05 | 0.953259 |
| **Mean VIF** | 2.07 | |

Source: Survey result, 2015.

Appendix Table 2: Contingency coefficient of dummy variables

| | SEXHH | FS | BT | ACCEXT | AC | MI |
|---|---|---|---|---|---|---|
| SEXHH | 1 | | | | | |
| FS | 0.1658 | 1 | | | | |
| BT | 0.1215 | 0.3976 | 1 | | | |
| ACCEXT | 0.1143 | 0.6376 | 0.3870 | 1 | | |
| AC | 0.1494 | 0.4251 | 0.3747 | 0.5417 | 1 | |
| MI | 0.0379 | 0.4292 | 0.3480 | 0.6619 | 0.4413 | 1 |

Source: Survey result, 2015.

Appendix Table 3: Conversion factor of tropical livestock unit (TLU

| Livestock's | Conversion factor |
|---|---|
| Heifer | 0.75 |
| Cow or Ox | 1 |
| Horse/Mule | 1.10 |
| Donkey adult | 0.70 |
| Donkey young | 0.35 |
| Sheep or Goat | 0.13 |
| Chicken | 0.013 |
| Calf | 0.25 |
| Bull | 0.75 |

*Source*: Storck *et al*., 1991.

Appendix Figure 1: Poultry production in Betehanes and focus group discussion of the producers in Wedkeshi.

Appendix Figure 2:  Interview with poultry traders in Adwa town

Appendix Figure 3: Interview with key informants on poultry value chain in Adwa Wereda

# 8. DATA COLLECTION INSTRUMENTS

Part I: Producers' Questionnaire

Questionnaire number/ID: _____ Name of Interviewer: _____

Wereda/District: _____ Kebele/Tabia: _____

Date of Interview: _____ Name of Respondent: _____

**I. Demographics**

1. Name of Household head_____

2. Sex of the household: 1. Male 2. Female

3. Age of the household head: _____ years

4. Marital status of the household head: 1.Married 2.Single/ not married 3.Divorced 4.Widow

5. Family size including adults and children: Male:___ Female:___ Total____

6. Educational level of the household head in grade_____

7. Location of the household head: 1. rural 2. Urban

8. Major occupation of the household: 1) Farmer 2) Guard 3) Broker 4.trader 5. Others (specify)_____

**II. Asset ownership/Wealth, activities and income of household other than poultry**

1. Do you participate in farming other than poultry? 1=yes 2 =No
2. If yes for Q1, in what type? 1. Crop production 2. Livestock production 3. Others

**3.** For how many years did you farm in crop production? _____years.

4**.** For how many years did you farm livestock production? _____years

5. Do you have your own land? 1. Yes 2. No

6. If yes for Q5, Size of land holding (ha) _____

7. For what purpose do you use your land?

1) For crop production 2) Pasture development 3) Fallow 4) Unproductive 5) Others____

8. What was your area of land allocation to different activities (in 2014)?

| No | Land allocation for: | Hectare |
|---|---|---|
| 1 | Cropping | |
| 2 | Pasture/grazing land | |
| 3 | Fallow | |
| 4 | Unproductive | |
| 5 | Others (specify) | |

9. Major crops grown in 2014

| No | Crop type | Area (ha) | Production (qt) | Purpose ( qt) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Household Consumption | Seed | Sale | Wages In kind | Animal Feed | Others |
| 1 | Annual | | | | | | | | |
| 1.1 | Maize | | | | | | | | |
| 1.2 | Sorghum | | | | | | | | |
| 1.3 | Teff | | | | | | | | |
| 1.4 | Wheat | | | | | | | | |
| 1.5 | Barley | | | | | | | | |
| 1.6 | Millet | | | | | | | | |
| 1.7 | Bean | | | | | | | | |
| 1.8 | Pea | | | | | | | | |
| 1.9 | Others | | | | | | | | |
| 2 | **Perennial** | | | | | | | | |
| 2.1 | coffee | | | | | | | | |
| 2.2 | Mango | | | | | | | | |
| 2.3 | Orange | | | | | | | | |
| 2.4 | Lemon | | | | | | | | |
| 2.5 | Pepper | | | | | | | | |
| 2.6 | Papaya | | | | | | | | |
| 2.7 | Others | | | | | | | | |

10**.** Do you or any member of your family involve in any off-farm activities? 1. Yes 2. No

11. If yes, what were the off-farm activities and their incomes you or your family member?

| A | B | C | D |
|---|---|---|---|
| No | Off-farm activity (excluding poultry production) | Yes=1, No=2 | If yes, any yearly income of household head/Birr |
| 1 | Carpentry | | |
| 2 | Construction | | |
| 3 | Daily laborer | | |
| 4 | Sand stone collection & selling | | |
| 5 | Migration income | | |
| 6 | Handcrafts | | |
| 7 | Homemade drinks | | |
| 8 | Animal renting | | |
| 9 | Gold extracting | | |
| 10 | Charcoal | | |
| 11 | Milling (metehan) | | |
| 12 | Trade in grain | | |
| 13 | Trade in spices (pepper) | | |
| 14 | Trade in livestock | | |
| 15 | Trade in livestock products | | |
| 16 | Salary/Employment | | |
| 17 | Pension | | |
| 18 | Traditional healer | | |
| 19 | House renting | | |

| | | | |
|---|---|---|---|
| 20 | Traditional saving ‘equib’ & edir | | |
| 21 | Food or cash for work | | |
| 22 | Food Aid | | |
| 23 | Remittance/gifts/transfers | | |
| 24 | Others | | |
| 25 | Total | | |

**III. Livestock Production**

1. Do you have livestock? 1. Yes 2. No

2. Did you get financial income from livestock other than poultry? Yes= 1, No=2

3. If your answer to Q 2 is yes, fill the income you got last year (2014) in the table below.

| No | List of livestock | No | Numbers sold | Revenue from sales of animals | Rank in terms of their benefit to you |
|---|---|---|---|---|---|
| 1 | Dairy cows | | | | |
| 2 | Oxen | | | | |
| 3 | Sheep | | | | |
| 4 | Goats | | | | |
| 5 | Equines | | | | |
| 6 | Modern bee colony | | | | |
| 7 | Traditional bee colony | | | | |
| 8 | Others | | | | |
| 9 | Total | | | | |

4. Did you get an income from selling livestock products other than poultry? Yes= 1, No=2

5. If your answer to Q 4 is yes, fill the income you got last year (2014) in the table below.

| No | Livestock product | Amount | Amount sold | Revenue from sales of product |
|---|---|---|---|---|
| 1 | Cow milk | | | |
| 2 | Cattle Meat | | | |
| 3 | Sheep meat | | | |
| 4 | Goats meat | | | |
| 5 | Hide and skin | | | |
| 6 | Honey from modern hive | | | |
| 7 | Honey from traditional hive | | | |
| | Total income | | | |

**IV. Poultry production**

1. When did you start raising poultry? _____

2. Number of poultry in your initial stock _____

3. Where was your source for initial stock? _____

4. Current stock: 1. exotic _____2. Local _____

5. How was the production system you used for local poultry ? 1) Free range extensive system 2) Backyard extensive system 3) Semi intensive system 4) Intensive

**NB: Definitions for the above terms**

**Free range**: The chickens are not confined and can scavenge for food over a wide area. The birds may perch outside, usually in trees, and nest in the bush. The flock contains birds of different species and varying ages.

**Backyard extensive system**: Poultry are housed at night but allowed free-range during the day. They are usually fed a handful of grain in the morning and evening to supplement scavenging.

**Semi-Intensive Systems** (combination of the extensive and intensive systems): chicken are confined to a certain area with access to shelter. In the "**run**" system, the chicken are confined in an enclosed area outside during the day and housed at night. Feed and water are available in the house to avoid wastage by rain, wind and wild animals.

**Intensive Systems:** chicken are fully confined either in houses or cages. Capital outlay is higher and the birds are totally dependent on their owners for all their requirements; production however is higher.

6. was your housing system appropriate for the local poultry? 1. Yes, 2. No

7. Did you provide supplementary feed for your local poultry? 1. Yes, 2. No

8. If your answer to Q 7 is yes, what were the time interval and its amount per day?

_____

9. Did you provide clean water for your poultry? 1. Yes, 2. No

10. If your answer to Q 9 is yes, what were the time interval and its amount per day?

_____

11. What was the common feed used for local poultry in your farm?

1. Balanced feed (proper combination of cereal grain, oilseed cake, salt, bone meal and vitamins) 2. Only cereal grains 3. Both 4. Others)_____

12. How was the production system you use for exotic poultry ? 1. Free range extensive system 2. Backyard extensive system 3. Semi intensive system 4. Intensive

13. Is your housing system appropriate for the exotic poultry? 1. Yes, 2. No

14. Did you provide supplementary feed for your exotic poultry? 1. Yes, 2. No

15. If your answer to Q 14 is yes, what were the time interval and its amount per day?

_____

16. Did you provide clean water for your exotic poultry? 1. Yes, 2. No

17. If your answer to Q 16 is yes, what are the time interval and its amount per day?_____

18. What was the common feed used for exotic poultry in your farm? 1. Balanced feed (proper combination of cereal grain, oilseed cake, salt, bone meal and vitamins) 2. Only cereal grains 3. Both 4. Others_____

19. How did you provide feed for your poultry?

1. In stone feed trough 2. In wooden feed trough 3. In improved feed trough 4. On the ground

5. Free scavenging 6. Other ( specify)_____

20. How did you provide water for your poultry?

1. In stone water trough 2. In wooden water trough 3. In improved water trough 4. Other (specify)_____

21. Did you clean your poultry farm? 1. Yes, 2. No

22. If no why? _____

23. If yes, how often? 1. Daily 2. weekly 3. Twice pre month 4. Monthly 5. Others_____

**V. Input supply**

1. What is your input for poultry production & their sources in 2014?

| No | Types of inputs | 1. Yes, 2. No | Amount | Source | price |
|---|---|---|---|---|---|
| 1 | Local breed | | | | |
| 2 | Exotic poultry breed | | | | |
| 3 | Balanced feed | | | | |
| 4 | Unbalanced feed( only cereals) | | | | |
| 5 | Hay box chick brooder | | | | |
| 6 | Incubator | | | | |
| 7 | Water trough | | | | |
| 8 | Feed trough | | | | |
| 9 | Vet. Equipment and drugs | | | | |
| 10 | De-beaker | | | | |
| 11 | Others | | | | |

2. What was the estimated cost for poultry production in 2014?

| No | Different costs/ chicken | Local | Exotic | Total |
|---|---|---|---|---|
| 1 | Purchasing price of chicken | | | |
| 2 | Feed cost | | | |
| 3 | Water cost | | | |
| 4 | Labor cost | | | |
| 5 | Medication cost | | | |
| 6 | Materials cost | | | |
| 7 | Transport cost ( to purchase chicken) | | | |
| 8 | House rent | | | |
| 10 | Others | | | |
| 11 | Total | | | |

3. What was the estimated cost for egg production in 2014?

| No | Different costs/ egg | Local | Exotic | Total |
|---|---|---|---|---|
| 1 | Purchasing price of chicken | | | |

| | | | | |
|---|---|---|---|---|
| 2 | Feed cost | | | |
| 3 | Water cost | | | |
| 4 | Labor cost | | | |
| 5 | Medication | | | |
| 6 | Materials cost | | | |
| 7 | Transport cost | | | |
| 8 | House rent | | | |
| 9 | Light cost | | | |
| 10 | Others | | | |
| 11 | Total | | | |

4. What are the annual poultry productivity /chicken grown and egg production level and sold to the market in 2014?

| **Types of poultry** | **Egg production & sold to the market/year** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | No of productive chicken | No of eggs produced /year | No of eggs sold to: | | | | Price in: | | | | Total (birr) |
| | | | Col | Ret | Pro | Cons | Col | Ret | Pro | Cons | |
| Local p | | | | | | | | | | | |
| Improved p | | | | | | | | | | | |
| Total | | | | | | | | | | | |
| | **Pullets produced & sold to the market/year** | | | | | | | | | | |
| | No of productive chicken | No of pullets produced /year | No of pullets sold to: | | | | Price | | | | Total (birr |
| | | | Col | Ret | Pro | cons | Col | Ret | Pro | Cons | |
| Local p | | | | | | | | | | | |
| Improved p | | | | | | | | | | | |
| Total | | | | | | | | | | | |

NB. Col= Collectors, Ret=Retailers, Pro=Processors and Cons= Consumers.

**If you sold eggs and chickens to wholesalers, fill the following blank spaces.**

Number of eggs sold from local _____ price_____ total revenue _____

Number of eggs sold from exotic _____ price_____ total revenue _____

Number of chicken sold from local _____ price_____ total revenue _____

Number of chicken sold from exotic _____ price _____total revenue _____

5. Poultry productivity trends /chicken grown and egg production in the past 5 years?

| Poultry & egg production | Trend of poultry productivity | | | | |
|---|---|---|---|---|---|
| | Increasing | Decreasing | Same | Increasing why? | Decreasingwhy? |
| Local breed | | | | | |
| Improved breed | | | | | |
| Egg production( local) | | | | | |
| Egg production (exotic) | | | | | |

6. What were the constraints faced in your poultry production?

| No | Constraints | 1.yes, 2.No | Rank | Measures taken |
|---|---|---|---|---|
| 1 | Lack of balance feed | | | |
| 2 | Lack of pure water | | | |
| 3 | Lack of knowledge/education | | | |
| 4 | Disease | | | |
| 5 | Decrease in price of poultry | | | |
| 6 | Lack of housing | | | |
| 7 | Poor poultry breed | | | |
| 8 | Low experience | | | |
| 9 | Poor extension service | | | |
| 10 | Lack of credit | | | |
| 11 | Predation | | | |
| 12 | Others | | | |

7. Did your local poultry die in 2014? 1. Ye 2. No

8. If yes what the number that died?_____ chicken/year

9. If Yes, What were the reasons for the death? _____

10. What measures were taken to solve it?_____

11. What did it cost to solve the problem?_____

12. Did your exotic poultry died in 2014? 1. Ye 2. No

13. If yes what the number that died?_____ chicken/year

14. If Yes, What were the reasons for the death? _____

15. What measures were taken to solve it?_____

16. What did it cost to solve the problem?_____

17. What are the major predators found in the areas that threaten your poultry? Rank them in order of severity.

| No | Predators | 1.yes, 2.No | Rank | Used Control methods |
|---|---|---|---|---|
| 1 | Eagle | | | |
| 2 | Fox | | | |
| 3 | Snake | | | |
| 4 | Wild cats | | | |
| 5 | Wild dogs | | | |
| 6 | Rats | | | |
| 7 | Others (specify) | | | |

18. What were the opportunities that encouraged you to produce poultry? Rank them as first opportunity, second etc.

| No | Opportunities | 1.yes, 2.No | Rank |
|---|---|---|---|
| 1 | Ever-growing market demand | | |
| 2 | Income growth in the society | | |
| 3 | Population growth | | |
| 4 | Increasing urbanization | | |
| 5 | Establishment of poultry multiplication centers | | |
| 6 | Available resources for feed production (grains | | |
| 7 | Favorable policy of the government promoting food security | | |
| 8 | Providing free vaccines by the government | | |
| 9 | Providing improved chickens by the government | | |
| 10 | Need small space and starting capital | | |
| 11 | Good source of human nutrition especially for the poor | | |
| 12 | Good source of income especially for women | | |
| 13 | Good social and cultural values | | |
| 14 | Others | | |

**VII. Access to credit and extension service**

1. Did you have extension contact in relation to poultry production? 1=Yes 2= No

2. If yes, how often the extension agent contacted you specifically in poultry production and marketing aspects? 1. Daily 2. Weekly 3. Once in two week 4. Monthly 5. Once in a year 6. Twice a year 7. Others ( specify)_____

3. What type of services did you obtain? Rank vertically

| No | What services are obtained | 1.yes, 2.No | Rank |
|---|---|---|---|
| 1 | Feed and feeding system | | |
| 2 | Housing system | | |
| 3 | Disease prevention mechanisms | | |
| 4 | Predator control | | |
| 5 | Egg handling system | | |
| 6 | Marketing | | |
| 7 | Others | | |

4. Do you have access to credit? 1=Yes 2= No

5. If your answer to Q 4 is yes, who is the service provider? 1. Gove't organizations 2. NGO 3. Friends 4. Relatives 5. Others (specify)_____

6. What are the major problems you face to get input on credit?

1. Inaccessibility of credit agents 1. Yes 2. No

2. Debit collection problem 1. Yes 2. No

3. High interest rate 1. Yes 2. No 4. Others _____

7. If yes Q 6, how much did you take for poultry production purpose in 2014?_____Birr.

8. If your answer for Q 6 is yes, for what purpose do you take the credit?

1. To purchase poultry 2. To purchase housing materials 3. To purchase feed 4. To purchase food grains 5. To purchase technology 6. Others (specify)_____

**VIII. Marketing Aspect**

1. Did you bring your poultry to the market? 1. Yes, 2. No

2. Did you bring your egg production to the market? 1. Yes, 2. No

3. What were the factors that hinder not to supply your product to the market? Rank them

| No | Factors not to supply poultry products to the market | 1.yes, 2. No | Rank the factors |
|---|---|---|---|
| 1 | Long distance to the market | | |
| 2 | lack of transportation | | |
| 3 | Lack of information | | |
| 4 | Having small number of poultry & eggs | | |
| 5 | Disease outbreak | | |
| 6 | Small family size | | |
| 7 | Seasonal demand | | |
| 8 | Price fluctuation | | |
| 9 | Others( specify) | | |

4. To whom did you sell your poultry products? 1. Wholesaler 2. Local collector 3. Retailer 4. Processor 5. Consumer

5. What were the numbers of poultry and their price sold to d/t traders and consumers monthly in 2014?

| Traders & consumers | Price of chicken (Birr/chicken) | | Number sold/month | | For how many months | Income |
|---|---|---|---|---|---|---|
| | local | Exotic | local | Exotic | | |
| Wholesaler | | | | | | |
| collector | | | | | | |
| Retailer | | | | | | |
| Processor | | | | | | |
| Consumer | | | | | | |

6. What is the number of eggs and its price sold to d/t traders and consumers monthly in 2014?

| Traders &c | Price of egg ( Birr/egg | | Number sold/month | | For how many months | Income |
|---|---|---|---|---|---|---|
| | local | Exotic | local | Exotic | | |
| Wholesaler | | | | | | |
| Local collector | | | | | | |
| Retailer | | | | | | |
| Processor | | | | | | |
| Consumer | | | | | | |

7. Did you get market price information of poultry and eggs? 1=Yes 2=No

8. What is the average cost incurred for poultry to reach it to d/t market agents?

| **Traders & consumers** | **Costs incurred/ chicken** | | | | | |
|---|---|---|---|---|---|---|
| | **Feed cost** | **Transporting cost** | **Medication cost** | **Labor cost/ch** | **Personal transport cost** | **Total cost** |
| Wholesaler | | | | | | |
| Collector | | | | | | |
| Retailer | | | | | | |
| Processor | | | | | | |
| Consumer | | | | | | |

9. What is the marketing cost of eggs to reach it to d/t market agents?

| **Traders & consumer** | **Costs incurred/single egg** | | | | |
|---|---|---|---|---|---|
| | Loading | Transporting | Labor cost/egg | Personal tran cost | Total cost |
| Wholesaler | | | | | |
| collector | | | | | |
| Retailer | | | | | |
| Processor | | | | | |
| Consumer | | | | | |

10. Does your produce have preferred quality by buyers ? 1= Yes 2=No

11. If no Q10, what interventions are needed to attract better price? _____

12. How do you make decision as to when to sell your poultry and eggs?

1. Maturity 2. Fear of predators 3. Holidays 4. Fear of rotting (eggs)

5. Market price 6. Fear of disease 7. Others (specify) _____

13. What were the problems created by traders?

1. Cheating on quality of eggs 2. Wrong market information 3. Others (specify) _____

14. What is the distance of the wereda market from your home?_____

15. On average how long did it take you to sell your poultry and eggs? _____

16. What do you do if you didn't get the expected price for your poultry and eggs?

1. Took back home 2. Sold at lower price 3. Took to another market on the same day 4. Sold on other market day 5. Others( specify)_____

17. How do you see your relationship with traders and consumers?

1. Strong 2. Weak 3. Doesn't exist

18. Did you exchange information with your buyers on the amount, quality and price of poultry and eggs required? 1= Yes 2=No

19. Relationship matrix among value chain actors

| | Linkage * | | | | If linkage Yes; nature of linkage[xx] | | | | If linkage Yes; how much do you trust[xxx]? | | | | frequency of with other organization meeting/ year[xxxx] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | C | T | P | F | C | T | P | F | C | T | P | F | C | T | P |
| Farmers(F ) | | | | | | | | | | | | | | | | |
| Cooperati ves(C) | | | | | | | | | | | | | | | | |
| Traders(T) | | | | | | | | | | | | | | | | |
| Processors (P) | | | | | | | | | | | | | | | | |

* 1=Yes; 2=No; [xx]:1= informal; 2=verbal arrangement; 3=written agreement; [xxx:-]1=distrust; 2=no trust; 3=a little trust; 4=some trust; 5=full trust; [xxxx]: 1=ones; 2=twice; 3=three times; 4= four times; 5=irregularly

20. What factors constrain the linkages between poultry value chain actors?

1. Policy 2. Organizational 3. Infrastructure 4. KSA(knowledge, skill, attitude ) 4. Others (specify)___

21. What do you recommend to improve poultry value chain in the future?

_____

**End of the interview**

**Thank you very much for responding to the questions.**

Name of the Enumerator: _____ Date of Interview: _____

**Part II: Traders questionnaire**

Questionnaire number/ID: _____ Name of Interviewer: _____

Wereda/District: _____ Kebele/Tabia: _____ Date of Interview: _____

**I. Demographics**

1. Name of trader_____Code:_____Date_____

Tabia: _____Kushet:_____ Age_____Sex_____

2. Family size: _____ Male_____Female_____

3. Marital status: 1. Married 2.Not married 3. Widowed 4. Divorce

4. Educational level of trader _____

**Multiple answers is possible for some of the questions**

1. What is your main occupation?1. Wholesaler 2. Collector 3. Retailer 4. Others (specify)_

2. How long have you been in poultry and eggs trading? _____years.

3. Do you participate in poultry trading year round? 1= Yes 2= No

4. If no Q3, at what period of the year do you participate?

1. When purchase price becomes low 2. During high poultry supply 3 During high demand 4. Others (specify)_____

5. Do you participate in eggs trading year round? 1= Yes 2= No

6. If no Q5, at what period of the year do you participate? 1. When purchase price becomes low 2. During high supply 3. During high demand 4. Other (specify)_____

7. From where did you purchase poultry and eggs? 1. From village market, name of village market (specify)_____ 2. From Adwa market, name of market (specify) _____

3. Other market_____

8. How do you attract suppliers? 1. Giving better price 2. Visiting their farm 3.Other____

9. Who purchase poultry and eggs for you? 1. Myself 2. Family members 3 . Broker

4. Friends 5. Others_____

10. From whom did you purchase chicken on every Saturday in 2014? (Fill the questions prepared in the table below)

| Purchased from: | No supplied to the market | | No purchased | | Purchasing price | |
|---|---|---|---|---|---|---|
| | Local | Exotic | Local | Exotic | Local | Exotic |
| Producers | | | | | | |
| Local collectors | | | | | | |
| wholesalers | | | | | | |
| Others | | | | | | |

11. Estimated cost for poultry marketing at different sellers (Birr/chicken)

| No | Costs/chicken at d/t sellers | Producer | Collector | Retailer | Wholesaler |
|---|---|---|---|---|---|
| 1 | Purchasing price of local p | | | | |
| 2 | Purchasing price of exotic p | | | | |
| 3 | Feed cost | | | | |
| 4 | Water cost | | | | |
| 5 | Transportation cost | | | | |
| 6 | Labor cost | | | | |
| 7 | Distribution cost | | | | |
| 8 | Personal transport cost | | | | |
| 9 | House rent | | | | |
| 10 | Tax | | | | |
| 11 | Telephone | | | | |

12. To whom did you sell the purchased chicken in 2014?

| Sold to: | No sold | | Selling price (Birr/chicken) | | Total income ( later ) | Net income (later) |
|---|---|---|---|---|---|---|
| | Local | Exotic | Local | Exotic | | |
| Consumer | | | | | | |
| Retailer | | | | | | |
| wholesalers | | | | | | |
| Processors | | | | | | |

13. From whom did you purchase eggs on every Saturday in 2014? (Fill the questions prepared in the table below)

| Purchased from: | No supplied to the market | | No purchased | | Purchasing price | |
|---|---|---|---|---|---|---|
| | From local | From exotic | From local | From exotic | From local | From exotic |
| Producers | | | | | | |
| Local collectors | | | | | | |
| wholesalers | | | | | | |
| Others | | | | | | |

14. Estimated cost for egg marketing at different sellers (Birr/egg)

| No | Costs/chicken at d/t sellers | Producer | Collector | Retailer | Wholesaler |
|---|---|---|---|---|---|
| 1 | Purchasing price of local egg | | | | |
| 2 | Purchasing price of exotic egg | | | | |
| 3 | Egg handling cost | | | | |
| 4 | Transportation cost (egg) | | | | |
| 5 | Personal transport cost | | | | |
| 6 | Labor cost | | | | |
| 7 | Distribution cost | | | | |
| 8 | House rent | | | | |
| 9 | Tax | | | | |
| 10 | Telephone | | | | |

15. To whom did you sell the purchased eggs in 2014?

| Sold to: | No sold | | Selling price (Birr/ egg ) | | Total income (Later) | Net income (Later) |
|---|---|---|---|---|---|---|
| | From local | From exotic | from local | From exotic | | |
| Consumer | | | | | | |
| Retailer | | | | | | |
| wholesalers | | | | | | |
| Processors | | | | | | |

19. Was obtaining sufficient volume of poultry a problem in 2014? 1= Yes, 2= No

20. Was obtaining sufficient volume of eggs a problem in 2014? 1= Yes, 2= No

21. From which market (s) did you prefer to buy most of the time? From_____ market.

22. Why did you prefer this market?

1. Better quality 3. High supply 2. Shortest distance 4. Low price 5.Others _____

23. How did you get information about the availability and market of poultry?_____

24 How did you decide the selling price of poultry and eggs in the market_____

25. Did you face price fluctuation of poultry at different months? 1. Yes, 2. No

26. If yes for Q25, what was the reason?_____

27. Did you face price fluctuation of egg at different months? 1. Yes, 2. No

28. If yes for Q27, what was the reason?_____

29. What were the opportunities to run poultry trading?

1. Increasing demand 2. Need low capital to run poultry trading 3. Easy to handle and transport 4. Good policy on trading 5.others_____

20. What were the constraints faced in poultry and eggs trading in 2014?

| No | Constraints at d/t traders | Collector | Retailer | Wholesaler | 1.yes, 2.No | Rank |
|---|---|---|---|---|---|---|
| 1 | Lack of market information | | | | | |
| 2 | Lack of chicken supply | | | | | |
| 3 | Poultry disease | | | | | |
| 4 | Poor genetic potential | | | | | |
| 5 | Poor linkage with value chain actors | | | | | |
| 8 | Lack of knowledge | | | | | |
| 9 | Lack of transportation | | | | | |
| 10 | Lack of credit | | | | | |
| 11 | Presence of non licensed traders | | | | | |
| 12 | lack of marketing place | | | | | |

If yes; rank as: #=very sever, ## sever, ### less sever

29. Relationship matrix among value chain actors

| | Linkage * | | | | If linkage Yes; nature of linkage[xx] | | | | If linkage Yes; how much do you trust[xxx]? | | | | frequency of with other organization meeting/ year[xxxx] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | C | T | P | F | C | T | P | F | C | T | P | F | C | T | P |
| Farmers (F) | | | | | | | | | | | | | | | | |
| Cooperatives(C) | | | | | | | | | | | | | | | | |
| Traders(T) | | | | | | | | | | | | | | | | |
| Processors (P) | | | | | | | | | | | | | | | | |

* 1=Yes; 2=No; [xx]:1= informal; 2=verbal arrangement; 3=written agreement; [xxx:-]1=distrust; 2=no trust; 3=a little trust; 4=some trust; 5=full trust; [xxxx]: 1=ones; 2=twice; 3=three times; 4= four times; 5=irregularly

30. What factors constrain the linkages between poultry value chain actors? 1. Policy 2. Organizational 3. Infrastructure 4. Lack KSA (knowledge, skill, attitude and motivation 4. Others (specify)_____

31. What do you recommend to improve poultry value chain in the future?_____

**End of the interview**

**Thank you very much for responding to the questions.**

Name of the Enumerator: _____ Date of Interview:

**Part III: Processors' questionnaire**

1.Name _____ Sex___ Age _____Code:_____Date_____

Tabia: _____Kushet:_____

2. Family size: _____ Male_____Female_____

3. Marital status: 1. Married 2.Not married 3. Widowed 4. Divorce

4. Educational level of consumer _____

5. What is your monthly and annual financial income?_____&_____Birr

6. From whom did you purchase chicken on every Saturday in 2014? ( fill the questions prepared in the table below)

| Purchased from: | No supplied to the market | | No purchased | | Purchasing price/chicken | |
|---|---|---|---|---|---|---|
| | Local | Exotic | Local | Exotic | Local | Exotic |
| Producers | | | | | | |
| Local collectors | | | | | | |
| Retailers | | | | | | |
| wholesalers | | | | | | |

7. What type of processed poultry product did you prepared for sale?_____

8. Estimated cost for processed poultry

| No | Different costs | Birr/chicken from | | | |
|---|---|---|---|---|---|
| | | Producer | collector | Retailer | wholesaler |
| 1 | Purchasing price of local poultry | | | | |
| 2 | Purchasing price of exotic poultry | | | | |
| 4 | Transportation cost | | | | |
| 5 | Labor cost | | | | |
| 6 | Electricity cost | | | | |
| 7 | Charcoal cost | | | | |
| 8 | Food oil cost | | | | |
| 9 | Salt cost | | | | |
| 10 | Pepper cost | | | | |
| Total | | | | | |

9. To whom did you sell the processed poultry in 2014?

| Sold to: | Selling price of in Birr | | Total income (Later ) | Net income (Later) |
|---|---|---|---|---|
| | local chicken | Exotic chicken | | |
| Any customer | | | | |
| Others | | | | |

10. From whom did you purchase eggs on every Saturday in 2014? (Fill the questions prepared in the table below)

| Purchased from: | No supplied to the market | | No purchased | | Purchasing price | |
|---|---|---|---|---|---|---|
| | From local | From exotic | From local | From exotic | From local | From exotic |
| Producers | | | | | | |
| Local collectors | | | | | | |
| Retailers | | | | | | |
| wholesalers | | | | | | |
| Others | | | | | | |

11. Estimated cost of the processed egg

| No | Different costs | Birr/egg |
|---|---|---|
| 1 | Purchasing price of eggs from local poultry | |
| 2 | Purchasing price of eggs from exotic poultry | |
| 3 | Cost of egg handling | |
| 4 | Transportation cost | |
| 5 | Labor cost | |
| 6 | Charcoal cost | |
| 7 | Food oil cost | |
| 8 | Salt cost | |
| 8 | Electricity cost | |
| 9 | Pepper/berbere cost | |
| 10 | Others | |
| Total | | |

12. To whom did you sell the processed eggs in 2014?

| Sold to: | Selling price of processed egg in Birr | | Total income (Later) | Net income (Later) |
|---|---|---|---|---|
| | From local chicken | From exotic chicken | | |
| Any customer | | | | |
| Others | | | | |

13. Was obtaining sufficient volume of poultry a problem in 2014? 1= Yes, 2= No

14 Was obtaining sufficient volume of egg a problem in 2014? 1= Yes, 2= No

15. From which market (s) do you prefer to buy most of the time? From_____ market.

16. Why do you prefer this market?

1. Better quality 3. High poultry supply 2. Shortest distance 4. Low price 5.Others ___

17.How did you decide the selling price of processed poultry and eggs in your café or hotel?_____

18. Did you face price fluctuation of poultry at different months? 1. Yes, 2. No

19. If yes Q18, what was the reason?_____

20. Did you face price fluctuation of egg at different months? 1. Yes, 2. No

21. If yes Q20, what was the reason?_____

22. What were the opportunities to run poultry processed product trading?

1. Increasing demand 2. Need low capital to run poultry trading 3. Easy to handle and transport 4. Good policy on trading 5.others_____

23. What were the constraints faced in poultry purchasing and selling processed product in 2014?

| No | Constraints | Yes=1 No = 2 | Rank them( #= Very sever, ##= sever , ###=less severe) |
|---|---|---|---|
| 1 | Lack of market information | | |
| 2 | Lack of chicken supply | | |
| 3 | Poultry disease | | |
| 4 | Poor genetic potential | | |
| 5 | Poor linkage with other value chain actors | | |
| 6 | Lack of knowledge | | |
| 7 | Lack of transportation | | |
| 8 | Lack of credit | | |
| 9 | Low customer/ demand | | |
| 10 | Others | | |

24. Relationship matrix among value chain actors

| Actors | Linkage * | | | | If linkage Yes; nature of linkage[xx] | | | | If linkage Yes; how much do you trust[xxx]? | | | | frequency of with other organization meeting/ year[xxxx] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | C | T | P | F | C | T | P | F | C | T | P | F | C | T | P |
| Farmers(F) | | | | | | | | | | | | | | | | |
| Cooperative(C) | | | | | | | | | | | | | | | | |
| Traders(T) | | | | | | | | | | | | | | | | |
| Processors(P) | | | | | | | | | | | | | | | | |

* 1=Yes; 2=No; [xx]:1= informal; 2=verbal arrangement; 3=written agreement; [xxx]:-1=distrust; 2=no trust; 3=a little trust; 4=some trust; 5=full trust; [xxxx]: 1=ones; 2=twice; 3=three times; 4= four times; 5=irregularly

25. What factors constrain the linkages between poultry value chain actors?

1. Policy 2. Organizational 3. Infrastructure 4. KSA(knowledge, skill, attitude and motivation 4. Others (specify)___

26. What do you recommend to improve poultry value chain in the future?

_____

_____

**End of the interview**

**Thank you very much for responding to the questions.**

Name of the Enumerator: _____ Date of Interview:_____

**Part IV: Consumers' questionnaire**

1.Name _____ Sex___ Age _____Code:_____Date_____

Tabia: _____Kushet:_____

2. Family size: _____ Male_____Female_____

3. Marital status: 1. Married 2.Not married 3. Widowed 4. Divorce

4. Educational level of consumer _____

5. What is your monthly financial income?_____Birr

6. What is your annual financial income?_____Birr

7. From whom did you purchase poultry and eggs?

1. Direct from producer 2. From collectors 3. From retailers 4. From wholesalers

8. What is the price of poultry and eggs in the different market agents?

| Agents | Price of eggs in Birr | | Price of poultry in Birr | |
|---|---|---|---|---|
| | From local | From Exotic | Local breeds | Exotic breeds |
| Producer | | | | |
| Collector | | | | |
| Retailer | | | | |
| Wholesaler | | | | |

9. From whom did you prefer to purchase poultry and eggs? 1. Direct from producer 2. From collectors 3. From retailers 4. From wholesalers

10 Why?_____

11. At what time did you observe those poultry and eggs prices were cheap?

_____

12. At what time did you observe those poultry and eggs prices were expensive?

_____

13. What type of poultry do you prefer to purchase?

1. Local breed 2. Cross breed 3. Exotic breed

14. Why?_____

15. What type of poultry eggs do you prefer to purchase?

1. Eggs from local breed 2. Eggs from cross breed 3. Eggs from exotic breed

16. Why_____

17. Are you satisfied by the poultry you were purchasing? 1= yes 2=No

18. If No why?_____

19. Are you satisfied by the eggs you were purchasing? 1= yes 2=No

20. If No why?_____

21. What were the problems that influence your frequency of purchasing poultry and eggs for consumption? Rank horizontally as (1= most severe, 2= second severe 3=third sever, etc)

| No | Constraints | Poultry | Eggs |
|---|---|---|---|
| 1 | Shortage of supply | | |
| 2 | Shortage of income | | |
| 3 | Lack of supplier customer | | |
| 4 | Perish ability ( egg) | | |
| 5 | High price of poultry products | | |
| 6 | Lack of market information | | |
| 7 | Others, specify | | |

22. How did you see your relationship with poultry producers and traders?

1. Strong 2. Weak 3. Doesn't exist

23. Did you exchange an information with sellers on the amount and quality of poultry and eggs required? 1= yes 2=No

24. What factors constrain the linkages between poultry value chain actors?

1. Policy 2. Organizational 3. Infrastructure 4. KSA(knowledge, skill, attitude and motivation 5. Others (specify)_____

25. What do you recommend to improve poultry value chain in the future?

_____

_____

**End of the interview**

**Thank you very much for responding to the questions.**

Name of the Enumerator: _____ Date of Interview:_____

## Part V: General questions for key informants

(It will include for input and output marketing experts, extension workers, traders, processors, end users, NGOs workers in the study area and poultry experts from BoARD).

1. General information about the interviewee

| Name of interviewee | Sex (1=male 2= female) | Organization name | Type of organization * | Position | Location | Level of education |
|---|---|---|---|---|---|---|
| | | | | | | |

* 1. Public 2. private 3,NGO (local & international 4. community based organization 5. other

2. What is the main source of income for the people living in your wereda?

_____

3. How do you express the contribution poultry production as a source of income for the people as compared to other sources of income? _____

4. What is the role of your organization in poultry value chain development in the study area?

_____

5. How do you undertake those roles assigned to you? (In isolation or in collaboration with others)

6. What are the main challenges that are affecting poultry production in the study area?

_____

7. What are the serious problems regarding the poultry production in the wereda?

_____

8. What possible and effective solutions do they employ to deal with the challenges they face?_____

_____

9. What are the opportunities that exist in your wereda that can be exploited in improving poultry production and marketing activities?_____

10. How about the trends of quantity of production and marketing? Is it increasing? or decreasing? What are the reasons for increasing or decreasing poultry supply?

_____

11. What are the different core processes in the poultry value chain?

_____

12. Who are the actors involved in these processes and what do they actually do?

_____

13. What are the flows of product, information and knowledge in the value chain?

_____

14. What is the number of actors, the volume of products, employment provided by the chain actors?_____

15. Where does the product (or service) originate from and where does it go?

_____

16. How does the value change throughout the chain?

_____

17. Who are the dominant players in the poultry value chain?

_____

18. What are the revenues of each value chain actor i.e. what volumes of poultry and eggs are sold by each of the value chain actor and at what prices?

_____

19. What are underlying causes of the division of costs and margins in poultry value chain?

_____

20. Upgrading

i. What upgrading options for poultry value chain are available?

_____

ii. Can the costs of poultry production/marketing/transporting be reduced?

_____

iii. Can speed of delivery of poultry to consumers/market be increased?

iv. Can a transporter use better poultry container to reduce poultry risks/damage?

_____

21. Linkage /interaction/ coordination between actors (using actor's linkage matrix)

- ✓ Forms of linkage mechanism_____

- ✓ Strength of linkage (strong, medium, weak, non existence)
- ✓ Why linkage is strong/ weak/ non existent_____
- ✓ Linkage arrangement employed_____
- ✓ Factors constraining linkage between actors(policy, organizational, attitudinal and motivation, etc related)_____
- ✓ Are sector-coordinating bodies present or absent? If present, are they effective?
- ✓ _____

22. Are there favorable environment (policies, institutional arrangement and incentive mechanisms) to promote collaboration, production and marketing in the study area?

_____

**End of the interview**

**Thank you very much for responding to the questions.**

Name of the interviewer : _____ Date of Interview:_____

**Part VI: Checklist for Group Discussion in poultry producers**

Tabia_____

Date_____

1. What type of chicken do you have?_____
2. How did you manage your chicken?_____
3. Do you have separate house for adult and young chicken? 1. Yes, 2. no
4. Have you provide supplementary feed for your chicken regularly? 1. Yes, 2. No
5. What is the age at first egg both for exotic and local chicken?

   For exotic _____months & local _____ months

6. Who are the dominant actors in poultry value chain?

_____

7. What are the problems faced most in your poultry production and marketing?

_____

_____

8. How do you evaluate the extent of extension services you have gotten?

   _____

9. What about the credit services?_____
10. How do you evaluate the relationship with support service providers, traders and consumers?

_____

_____

11. Mention if you have any ideas concerning poultry value chain

_____

_____

_____

***Thank you very much***