Enset Value Chain Analysis and its Determinants: The Case of Rural Households in AbeshgeWoreda Gurage Zone, Ethiopia

By

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This is to certify that the thesis prepared by Mistre Zergaw entitled: Value Chain Analysis and its Determinants: The Case of Rural Households in AbeshgeWoreda Gurage Zone, Ethiopia and submitted in fulfilment of the requirements for the Degree of Masters in Rural Livelihood and Development complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Thank you All!

DECLARATION

I declare that this thesis is my original work and all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted to the Center for Rural Livelihood and Development in partial fulfillment of the requirements for the award of Master of Social Science degree in Developmental Studies at Addis Ababa University. I seriously pronounce that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

Name: Mistre Zergaw Woldegiorgis

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Date of submission: June, 2019

DEDICATION

I dedicate this thesis to my beloved brother Dr. Demis Zergaw and Late sister Mrs. Senait Zergaw for nursing me with affection, unreserved assistance and for them dedicated encouragement in my academic carrier. I always pray Almighty God to rest her soul in peace at heaven.

BIOGRAPHICAL SKETCH

The author was born in Yirgalem town of Southern Nation, Nationalities and Peoples Region (SNNP). She attended her elementary & secondary School at Yirgalem Secondary school.

Then after she joined St'Mary University College in 2005 and graduated with Diploma in Secretarial Science and Office Management 20th July, 2007. After graduation she worked in Ministry of Agriculture for four years and then Ethiopian Civil Aviation for three years, as senior secretary. From February 11, 2013 to date, in Organization for Social Science Research in Eastern and Southern Africa (OSSREA) working as a secretary. She has done her BA degree in Public Administration and Development Management at Addis Ababa University in June 2011. She joined Addis Ababa University to follow her MA degree in Rural Livelihood and Development program.

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ABBREVIATIONS AND ACRONYMS

AU	African Union
AWANRO	Abeshge woreda Agriculture and natural resource office
CSA	Central Statistics Agency
DRMFS	Disaster Risk Management and Food Security
EASPIF	Ethiopia's Agricultural Sector Policy and Investment Framework
ERDPS	The Ethiopian Rural Development Policy and Strategies
IFAD	International Fund for Agricultural Development
FAO	Food and Agriculture Organization
MVL	Multivariate Probit Model
OLS	Ordinary List Square
TLU	Tropical Livestock Unit
TGMM	Total Gross Marketing Margin
UNIDO	United Nations Industrial Development Organization
SNNPRS	Southern Nation, Nationalities & Peoples Regional States
CLR	Classical Linear Regression
VIF	Variance Inflation Factor

Value Chain Analysis and Its Determinants: The Case of Rural Households in Abeshge Woreda, Gurage Zone, Ethiopia

ABSTRACT

The aim of this research was to investigate the Value Chain Analysis and its Determinants: The Case of Rural Households in Abeshge Woreda Gurage Zone. Data was collected from primary and secondary sources. Primary data for this survey was taken from two sample kebeles where154 households randomly selected from farmer households, 5 collectors, 15 wholesalers, 8 consumers and 5 key informants. To analyze the data, descriptive statistics and econometric models were used. The finding revealed that the production of Kocho and Bulla were used more for consumption while the rest was sold. This finding indicates that Kocho and Bulla are the staple food for the sampled kebeles. In addition, interview and observation results also showed that the production of Kocho and Bulla declined because of disease that destroyed the plant. The value chain analysis discovered that value chain actors in the sample kebeles were input suppliers/producers, wholesalers, retailers and end users/consumers. But there was lack of access to markets and roads, weak market information, lack of extension service and credit facilitation also a constraint to the producer share. The total marketing and profit margin share along the value chain actors (Producer, Wholesaler and Retailer). The findings indicate that retailer is more profitable followed by the wholesale side of the production. Multiple linear regressions also revealed that the market supply chain also increased because of the nearest access to transportation, age of the producer and production of kocho and bulla which could increase the amount of Kocho and Bulla. The Multivariate probit Model revealed that producers' likelihood of using the channels that maximize market outlet choice to get more profit would have been appropriate. Therefore, Government interventions in terms of policy on Kocho and Bulla value chain on marketing would help the producer get more profit. In the mean time, lack of access roads to the market and weak linkage to agricultural credit facilitations, has significantly affected the farmers to get profit and input supply. Hence, government has to create proper policies that will increase production that will sustain the society as a whole and the study area in particular, and this will support the value chains that need proper intervention to encourage the actors along the chain.

Keywords: ***Value chain, Enset, Abeshge woreda, Multivariate Probit model, Market outlet choice***

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Agriculture is an important source of livelihood for most African countries, and as such a lot of investments and policies have gone towards promoting it (FAO, 2012). However, food insecurity, which is mainly attributed to low productivity of traditional agriculture, continues to be one of the greatest challenges facing many African countries. According to AU (2014) the prevalence of undernourishment in Sub-Saharan Africa stood at 23.8% with most countries being characterised as food and nutrition insecure.

Agricultural productivity can play a vital role in economic growth by linking the supply and demand side (Johnston and Mellor, 1961) Kaplinsky (2000) and Kaplinsky and Morris (2001) cited by Ashenafi C. 2017; Value chain is the full range of activities which are required to bring a product or service from conception, through the different phase of production which involving a combination of physical transformation and the input of various producer services, delivery to final consumers, and final disposal after use. In value chain system independent actors are performing a sequence of value adding activities from conception over to phase of production to final consumption." The value chain can also be defined as a "sequence of related enterprises conducting activities so as to add value to a product from its primary production, through its processing and marketing to the final of the product to consumers (Macfadyen et al., 2012).

The base for the economy of Ethiopia is Agriculture, from those; 85% employ its population, over 43% of the country's gross domestic product (GDP) and over 80% of foreign exchange earnings. Irrespective of this fact, production method is dominated by small-scale subsistence farming system mostly based on low-input and low-output rain-fed agriculture, MoFED, 2010, cited by Asnake B. Et al, 2018.

Gender roles and relationships influence the division of work, the use of resources, and the sharing of the benefits of production between women and men. FAO, (1984) asserts that African small-scale farmers are predominantly women living in rural areas who spend up to 60% of their time in agriculture-related activities. These women mainly depend on their local community-based agricultural knowledge and innovation systems for agricultural production.

As Chaka A. (2016) stated post-harvest losses are a global problem and are of critical importance in food-insecure in countries such as Ethiopia. Losses of root and tuber crops are known to be high in developing countries. This includes *"Warqe"* (*Enseteventricosum),* a staple crop in Ethiopia on which a considerable portion of the population depends. Main value adding activities in this value chain are sorting and grading, weighing and packaging, storing and selling of both "*Kocho"*and "*Bulla"*. In *Kocho*, separation of fiber from the products is done to improve its quality *and all these* value adding activities are done by women for whose families *Enset* foods have been one of the staple foods.

Value chain analysis in agricultural marketing is a good means of assessing growth distribution issues and gender equitable growth. Besides, it helps to analyze the relative importance of factors affecting competitiveness, cost and earning of those involved in the value chain while identifying weaknesses in value chain performance and improving value chain performance (Macfadyen*et al*., 2012).

In addition, value chain analysis is important in determining the relationships and linkages between buyers and suppliers and a range of market actors in between (Wenz and Bokelmann, 2011). Thus value chain analysis of *warqe* is required to identify key players in the chain and to provide an understanding of their interactions and linkages within the chain. Food value chain analysis is a vital and flexible methodology to improve the value to producers and end consumers (Van Hoang, 2014).

While the role played by women in the process of production and marketing is huge, it has not been significantly appreciated and investigated particularly in relation to the place they hold in the Enset value chain. As Brandt *et al.* (1997) indicated, this food item in the production of which women play an important role is used as staple and co-staple food for millions of Ethiopians, particularly in Addis Ababa, Awassa, Dilla, Adama, Jimma, Wolayita Sodo,

Hosaena, Wolkite, Woliso, Bonga and Arba Minch and in other town and cities. It is such a magnitude of consumption of the item in many regions and urban areas of Ethiopia that served as a basis for the claim made by Chaka, A. (2016) that more than 50% of the Ethiopian population consume *warqe* regularly. Yet, not much is known about the contribution of women to the production and marketing of the product. Therefore, this study is intended to investigate the Enset production processing along the value chain and its determinants in Abeshge woreda Gurage Zone, Southern Ethiopia.

1.2 Statement of the Problem

Agriculture has a great contribution in the economies of African countries. However, as reported by Dessie et al, (2017), most farmers are not getting the right share of consumer price because of excessive cost margin arising mainly from inefficient and costly transport. Agriculture is central to Africa's agenda, and efforts have made to link production with agribusiness for better growth in the sector. However, the crops value chains reveal common and well-known constraints, such as poor infrastructure; fragmented and risky markets; poorly functioning input markets; difficulties accessing land, water, and finance; and inadequate skills and technology. More revealing, however, is the big differences across value chains (World Bank, 2013). In the Ethiopian case, besides transport problems, majorities of agricultural products are produced by small land holders who are not producing and selling their produce and agricultural inputs in an organized manner which makes it easier for middlemen to enjoy some of the benefits of sold products.

The Ethiopian farmers in general and in Southern nation and nationalities and peoples region in particular affected by low producer's price, on one hand, and high consumer's price, on the other hand. One of the reasons for this according to Wolday and Eleni (2003) is lack of proper transport facilities and other infrastructure services. In addition, Ethiopian agricultural output markets characterized by inadequate transport network, inadequate capital facilities, high handling costs, inadequate market information system, weak bargaining power of farmers and underdeveloped industrial sectors (Jema, 2008). *Enset* products are important sources of food and income, its production is crucial in Ethiopia. However, this huge potential of production has not fully exploited and promoted in the country. Poor marketing infrastructure, use of traditional

technologies, limited supply, and lack of marketing support services and market information contribute to under exploitation of *Enset* production potential (Steven *et al*., 1997). In addition, land shortage, recurrent drought, disease, lack of improved clones in terms of yield and disease resistance; labor shortage, lack of improved processing and storage technologies, improper or traditional agronomic practice, financial shortage and longtime maturity are the major challenge in *Enset* production (Abrham *et al.*, 2012). Moreover, food security, income generating and poverty alleviating capacity of *Enset* through collaborative work of value chain actors have not been fully addressed. The primary reasons, among others seems to be poor collaboration among and between value chain actors, inefficient *Enset* marketing characterized by high margins and poor marketing facilities and services is considered to be a major constraint to combating poverty (Ashenafi *et al.*, 2017).

In the past, most of interventions to develop *Enset* farm focused more on increasing production, especially the so-called high potential areas and with less attention to marketing system and value chain. However, the development of improved marketing system and linkages among actors (including input, suppliers, producers, collectors, wholesalers, retailers, and hotels and restaurants) are pivotal to increase production (Abebe and Paul, 2015).

The major value adding activities of enset products in Abeshge woreda : production, processing, marketing and consumption activities are not corresponding to create competitiveness and efficiency. Existing scenario indicates that enset value chain actors do not get opportunities to talk to each other about issues affecting the entire value chain (Nuri, 2016). As a result, information asymmetry in markets is ubiquitous and farmers may not be able to co-evolve with changing market conditions. Although, modern markets that give emphasis to quality and safety are believe to replace traditional markets and reduce market outlets for enset farmers. There is no empirical studies had conducted on estimating the status of enset value addition in the study area. The study on value addition could make enset products attractive for high value market opportunities. Interventions to improve the performance of enset products value chains need to be based on an understanding of the constraints and opportunities available and which are based on sound theoretical and empirical analysis. Accordingly, in this study, efforts have been made to analyze the value chain of enset in Abeshge woreda, Gurage zone. Additionally, this study also examines enset value chain options and the performance of actors in the chain; identify the

determinants of enset supply to the market and factors affecting market outlet choice decisions of enset producers in the study area.

1.3 Objective of the Study

The general objective of this study was investigating Enset value chain and its determinants by taking the case of rural Households in Abeshge Woreda, Gurage Zone.

1.3.1 Specific Objectives

The specific objectives of the study were to:

- Examine Enset value chain options and actors performance in the study area.
- Identifying determinates of Enset supply to the market in the study area.
- Identifying factors affecting market outlet choice decision of Enset producers in the study area.

1.4 Research Questions

1. How well does Enset value chain perform in the study area?
2. What are the factors that determine Enset production and supply in the value?
3. What is the determinant factors affecting the market choice in the study area?

1. 5 Scope and Limitation of the study

The study is concerned with Enset value chain and its determinants in rural households of Abeshge worda of Gurage Zone. Enset value chain was selected for the study since this study has not been studied. Additionally, the study was also geographically limited to Abeshge Woreda of Gurage Zone for lack of any studies conducted focusing on the Woreda.

1.6 Significance of the Study

This study is intended to generate empirical data and relevant information on the Enset production process and its determinants in the study area and beyond the stakeholders' involvement along the value chain. Besides, the results will be useful for both academics

and practitioners to obtain first hand woreda experience on the particular topic, which they can use as a spring board for further studies elsewhere in other Enset culture societies in the country. Moreover, local policy makers, planners and NGOs working on women's contribution on smallholder agriculture and rural livelihoods will use the results of the study to guide related studies or support their further commitment.

1.7 Organization of the Thesis

This thesis is divided in to 5 chapters, the 1st chapter has Introduction, Statement of the Problem, General & specific Objectives, Research questions, Scope and Significance of the Study. Chapter 2 presents review of literature on Enset Production and value chain analysis from different sources. Chapter 3 deals with description of the study area and design and methodologies of the study. In Chapter 4, both descriptive and econometric results are presented in detail and discussed. The final Chapter 5 summarizes the major findings of the study and draws conclusion and recommendations.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

This chapter deals with the related literature reviewed on Enset value chain and its determinants in relation to rural households. This review has four parts. The first part describes the theoretical review; the second part describes about review of empirical studies and the third one dedicated to the conceptual framework of the study.

2.1 Basic Concepts and terms in Enset production and Value chain

As Kaplinsky and Morris (2001), the evolution of global value chains, and increased competition among firms at different stages of the value chain, has resulted in new opportunities and challenges for new entrants. One the one hand, the global fragmentation of production in theory means that many low income countries can plug into global value chains and therefore benefit from „catch-up" growth (through resultant technology transfer, learning by doing, etc). On the other hand, some of the routes used in the past to achieve industrial development may not be as viable. Global value chain analysis focuses on the dynamics of inter-firm linkages within this system, and the way in which firms and countries are integrated globally. But it also goes beyond firm-specific linkages to reveal the dynamic flow of economic, organisational and coercive activities between producers within different sectors on a global scale.

2.1.1 Definitions of Concepts and Terms

Enset Cultivation

The cultivation system of Enset is one of the last remaining sustainable, indigenous agricultural systems found in Africa. Enset occurs in wild forms in East, Central, and South Africa. It became an emergency food during the Second World War in Vietnam (Asia). But, it is cultivated only in Ethiopia, where the crop was first domesticated possibly around 8000 years ago(Tsegaye and Westphal (2002) as cited by Mesfin Sahle, et al, (2018).

Enset *(Ensete ventricosum)* is distributed as a wild species in many parts of Sub-Saharan Africa, Tumescent Maule *et al., (*2014) cited Africa Mojo, (2017). It is the main crop of a sustainable

indigenous African system that ensures food security in a country that is food deficient. Ethiopia is one of the centers of diversity and origin for various agricultural crops (IBC, 2007). Among those crops, Enset which is also one of the oldest cultivated plants of Ethiopia. The country is the only one to domesticate the plant over large swaths of land and uses it as food and fiber crop (Aare Serif and Daniel Fatima, 2016). Yemane T & Fassil K 2006) also aserted that records mentioned that Enset has grown in Ethiopia for more than 10,000 years. According to Abraham Shumbolo *et al*. (2012), the cultivation of Enset in Ethiopia was estimated to spread over 67,000 square kilometers and ENSET planting is one of the major activities of agriculture in southern Nation, Nationalities and Peoples Regional State.

2.1.2 Concepts in Enset product and value chain

The value chain concept gained in importance for developing countries because it became obvious that successful exporters from developing countries were often linked to global value chains. A more systemic view of value chain development needs to take into account not only of the firms that are part of the actual core production chain, but also other actors that are impacting on the chain (Andreas Stamm/Christian von Drachenfels, 2011).

The history of value chain analysis goes back to the early 1990s as a novel methodological tool for understanding the dynamics of economic globalization and international trade. The approach focuses on 'vertical' relationships between buyers and suppliers and the movement of goods or services from producer to consumer. As an analytical tool, value chain analysis has become a key approach in both research and policy fields, with an increasing number of bilateral and multilateral aid organizations adopting it to guide several of their development interventions (Lone Riisgaard, et al: 2012).

2.1.3 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, as cited by Mulugeta G. 2018).

2.1.4 Gender Role in Rural Households

Gender is conceptualized as the socially constructed difference between women and men (Kabeer, 1999). Thus gender is about how society gives meaning to differences in femininity and masculinity, and the power relations and dynamics that come about as a result of this (Laven et al., 2009). Most women especially in low-income countries have triple roles. The first is their reproductive role, which comprises child bearing, child rearing, and domestic tasks required in guaranteeing the maintenance and reproduction of the labor force in the household. The second is the productive role that women play as income earners, which in most rural settings usually comprises agricultural work. As agricultural workers, women, play a significant role in the production of Enset. That explains the argument by Chaka, A. (2016) who claimed that it is mandatory to improve Enset production and processing activities by supporting gender sensitive value chain.

2.1.5 Mapping a Value Chain

Mapping a value chain facilitates a clear understanding of the sequence of activities and the key actors and relationships involved in the value chain. This exercise is carried out in qualitative and quantitative terms through graphs presenting the various actors of the chain, their linkages and all operations of the chain from pre-production (supply of inputs) to industrial processing and marketing (UNIDO, 2009).

Mapping the chain means giving a visual representation of the connections between actors and tracing a product flow through an entire channel from the point of product concept to the point of consumption. It is an ideal tool for measuring and quantifying the cost of administrative distortions that hinder competitiveness of products and industries. In its simplest form, the value chain is merely a flow diagram. Value chain can be complex and contains a big number of actors. Each actor can also be connected to more than one value chain. Therefore, it is important to know the aim of the study and the point of interest. Thereafter, decision can be made on where in the chain to start and what to include in the chain analysis. The first step in a value chain study is to identify the actors and the connections between them to get the chain mapped out. This can be done with a qualitative study, followed by a quantitative study when the map of the chain is completed. The quantitative study gives more information about activities and

relations in the chain and makes the study more certain (Kaplinsky and Morris 2000 and Hellin and Meijer, 2006) cited by Henok T. 2018.

2.1.6 Definitions of Important Terms

- **Enset**

Enset is one of the potential indigenous crops for food production which can be grown everywhere in Ethiopia. Asres Ayele and Omprakash Sahu,(2014) cited Taye, 1984; Endale, (1997), it is also a staple food and cash crop in the study area.

- **Kocho**

Kocho is starchy food product obtained from a mixture of the scraped pulp of pseudo stem and pulverizedcorm of Enset plant (Enseteventricosum). Enset ventricosum is a drought resistant plant which can be cultivated as an alternative food source for food security problem around the globe. Hence, it is a final product obtained from Enset for consumption and income generating in the study area.

- **Bulla**

The scraped leaf sheaths, peduncle and grated corm provide *Bulla*, which is the white-colored starch concentrate obtained from Enset plant (Demekech, 2008 as cited by Alemayehu A. 2017). Bulla is a high quality product obtained from further processing of Kocho which removes some byproducts. As a result, the price of Bulla in the market is higher than the price of Kocho. Thus, it is one of the marketable cash crops obtained from Enset in the study area.

- **Value chain**

Value chain can be defined as a "sequence of related enterprises conducting activities so as to add value to a product from its primary production, through its processing and marketing to the final supply of the product to consumers" (Macfadyenet al., 2012, pp 18-27).

2.2 Review of Empirical studies

2.2.1 Gender Analysis, Policies and Strategies

Agriculture plays a major role in the Ethiopian economy and this is expected to remain so for some years to come. This situation makes over 80 percent of the population of the country dependent on agriculture for food and as a source of income. To this, Negash, A. (2001) added that the agricultural sector is the basis for the entire socio-economic structure of the country and has a major influence on all other economic sectors and development processes.

Gender analysis is the first step towards understanding the gender issues that are relevant to value chain operations. Gender analysis identifies the gender relations that structure how smallholder households are organized and how they interact with other firms and economic processes.

A Handbook entitled, **"Promoting Gender Equitable Opportunities in Agricultural Value Chains:** is based on research studies and training programs conducted under the Greater Access to Trade Expansion (GATE) Project. The following statement by Hillary Clinton stated:

> *"Women are the backbone of farming in Africa, just as they are in most of the world. They plant the seeds, they till the fields, they harvest the crops, they bring them to market, they prepare the meals for their families. So, to succeed in this work, we must work with women. And so, we need a good collaboration to make sure that women are equal partners with men farmers all the way through the process… to enable… farmers who are women to make a contribution that will transform agriculture, add to the gross domestic product of their country, give them more income to educate their children to have a better life.' (Secretary of State Hillary Clinton in Kenya, August 5, 2009)."*

The claim made by Clinton (2009) suggests that women need to be given what they deserve as a result of their engagement in multitudes of work along the chain of value in production and marketing.

Gender disparities significantly impede women's empowerment. While the constitution of FDRE guarantees gender equality and supports affirmative action, on average, women have fewer years of schooling and heavier workloads than men. They perform a significant portion of farm work

but tend to be excluded from control of farm income and inheritance of property. Women also suffer disproportionately from environmental degradation as they have to walk longer distances to collect water and firewood. The lack of draught animal power tends to intensify their vulnerability. They also shoulder a greater burden of rural poverty because of their vulnerable socio-economic position (EASPIF, 2010-2020).

Ethiopia's Agricultural Sector Policy and Investment Framework (EASPIF, 2010-2020) indicated that the agricultural sector is critically important to both overall economic performance and poverty alleviation and has performed strongly over most of the last decade. Yet, there is still substantial scope to sustainably improve productivity, production and market linkages. Government has demonstrated strong commitment to the sector through allocation of more than 15% of the total budget, although a significant portion of this is spent on the Disaster Risk Management and Food Security (DRMFS) program. The sector remains dominated by subsistence, low input, low output, rain-fed farming system in which drought periodically reverses performance gains with devastating effects on household food security and poverty levels. The Policy and Investment Framework (PIF, 2010-2020) also indicated that Agricultural Development Led Industrialization (ADLI) is a central pillar of economic policy. It also claimed that in the agricultural sector, Ethiopia has a comprehensive and consistent set of policies and strategies which reflect the importance of the sector in the nation's development aspirations. However, the institutional capacity to implement these is generally limited.

The Ethiopian Rural Development Policy and Strategies (RDPS, 2003**)** identified five basic directions for agricultural development which envisage building on experiences and indigenous knowledge at the same time as exploring opportunities for deploying new technologies. Yet, these have not been utilized in Enset production process due to the absence of any technology employed to that effect. This is despite the fact that, Enset is used as a cash crop in the study area and a large amount of *Kocho* and *Bulla* produced is supplied to the central market.

2.2.2 Enset production, Consumption and Marketing in Ethiopia

More than 20 percent of the population of the country found in the highlands of southern and south western and eastern Ethiopia depends upon Enset for food, fiber, animal forage, construction materials, medicine, means of earning cash and insurance against hunger.

(Alemayehu A. 2018). As claimed by Belachew G. et al, (2017, Enset is a multi-purpose plant used only in Ethiopia for food and fiber particularly in the southern and south western and eastern parts of the country.

Cultivation of enset starting from planting up to the time it becomes ripe is totally the responsibility of men. In addition, it is also men who cut the leaves and feed animals until the plant matures for use as food. The hard and time-consuming task of processing it for food and the market is the exclusive responsibility of women in the family (Almeida, 2004).

The plant is harvested before it flowers. After harvesting, the process of production starts (Alemayehu A. (2017). The plant collected from the farm is stored at room temperature and later washed to avoid soil, insects, dust and any unwanted impurities which may decrease the quality of the product. The next step is the separation of leaf sheath from the plant starting with the older leaf sheaths (Ayele A. and Omprakash Sahu, 2014). The final outcomes of the production process are used for food and cash crop. Although women play a very significant role in the production and marketing process, they have not been able to get their fair share owing to the influence of many factors including systems which allow local collectors to determine the price of the produce.

2. 2.2.1 Uses of Enset

Enset can be harvested and consumed before it matures and these qualities of the crop have in part contributed to the fact that Enset areas are not characterized by a history of famine (Rahmato, 1996). The cultivation of Enset as food and fiber crop is limited to Ethiopia. As a cultivated plant, it is not known elsewhere in the world (Vavilov 1951). It is used both as a staple food and a source of income.

In addition, as Shumbulo A. et al. (2012) pointed out that although Enset production plays major economic and social roles, it is not included widely in extension packages. Little attention was given to research and extension services. Even though, substantial research and development has been carried out in Enset growing areas of the country for processing of Enset in order to facilitate its consumption by ever wider communities. As Admasu. T. & P. C. Struik (2002, p. 292) indicated citing farmers who claimed that “Enset is the enemy of hunger, and human and

livestock life is impossible without it". Despite its importance for food security and environmental sustainability, however, little research and development work has been done on Enset in modern production systems.

2.2.2.2 Enset Production and Marketing

According to Taye, 1984; Endale, 1997 cited Asres Ayele and Omprakash Sahu, 2014, enset is one of the potential indigenous crops for food production and can be grown everywhere in Ethiopia. Even though it is grown in many administrative regions, the dwellers of the central and southwestern parts of Ethiopia are the only people that use enset as a staple and co-staple crop (Simmonds, 1958). Regarding enset marketing, there is more than one channel that the product (kocho and bulla) gone from the producer to end users. The marketing process took traditional way that used different channel to reach to the consumer and not as such efficient.

2.2.2.3 The Role of Women on Enset Production Process

The Ethiopian proverb "A home without a woman is like a barn without cattle" indicates awareness about the important role of women both in the house and on the farm. Hardly anywhere were target groups taken as equal partners on the basis of respect for their knowledge, technology, world views and capability (Negash, 2001)

The preparation of Enset is a very time-consuming and hard work. Almost all the operations connected with Enset processing are the exclusive responsibility of women in the family (Almeida, 2004). Moreover, women farmers are particularly aware of the usefulness of plant genetic diversity, as they are the ones who bear the primary responsibility for the production of subsistence crops that are essential to household food security. They hold the knowledge of traditional varieties, their cultivation and maintenance as well as their utilization in the household. (Negash, 2001)

2.2.3 Level of Consumption

As indicated above, more than 20 percent population of the country living in the highlands of southern and south eastern Ethiopia depends heavily on Enset. More specifically, the Enset-based farming system is practiced by the Omotic and Eastern Cushitic speaking agriculturalists

of the highlands of Southwestern Ethiopia and the Ethio-Semetic speaking Gurage peoples of the southern central parts of the country. These people, who belong to over 45 ethnic groups, are significantly dependent on Enset primarily for food, though it is utilized for other household needs such as fiber, animal forage, construction materials, medicine, means of earning cash, income, and insurance against hunger (Chaka A., 2016).

According to CSA (2014), a total of 130,630,473 Enset (*warqe)* plants were harvested in Ethiopia in 2014 and produced 34,723.6 tonnes of *Kocho,* 12,259.4 tonnes of *Bulla* and 311.3 tonnes of *amicho.* In that period, 1,169,348 *warqe* plants were harvested in the major *warqe* growing area of west Shoa and 1,929,028 in south-west Shoa. Some of the food produced was supplied to local and central markets.

2.2.4 Women Role in a value chain

Understanding women's position in a value chain, how changes in a value chain might affect gender inequality, and the main constraints for women in terms of gaining from value chain participation requires one to place gender in the context of intra-household bargaining and of broader social processes dimensions, (Lone Riisgaard, et al. 2012, took from Wyrod, 2008: Parpart et al., 2002; Laven et al., 2009). Despite their crucial role in the chain, women are not appropriately rewarded.

Since women are in the first level of the chain which is the producer level, their share of the income is low. In other words, as Negash (2001) asserted, the performance of Kocho value chain was not efficient since farmers did not get a better share of the of consumers' price. Farmers generated the most added values in the chain but only gained a small share of profit (27 %).

2.2.5 Marketing Value chain

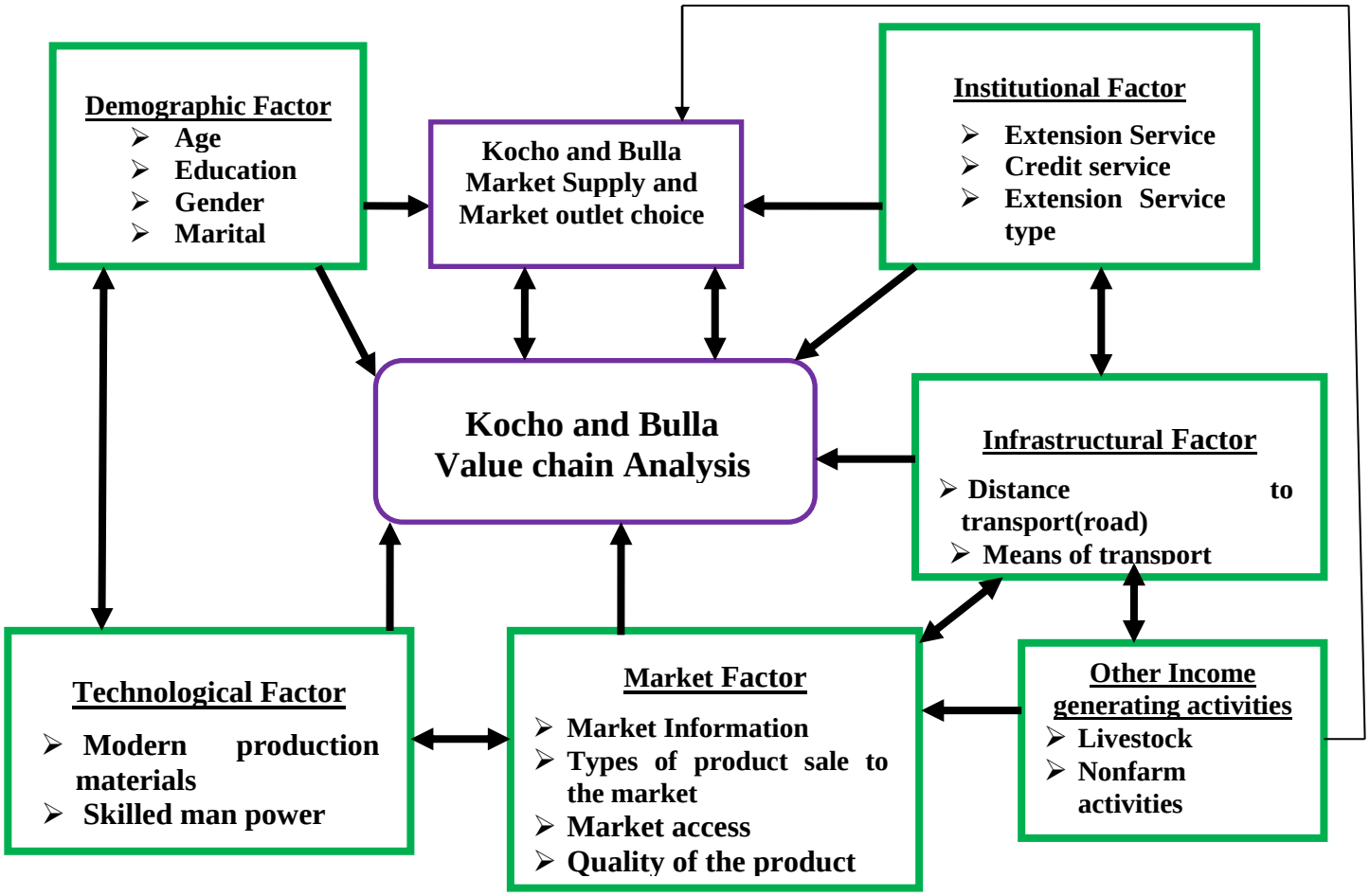
According to Urgessa M. (2011), marketing channel is a set of interdependent organizations that ease the transfer of ownership as products move from producer to consumer. Lamb et al (2004) added that a marketing channel can be viewed as a large canal or pipeline through which products, their ownership, communication, financing and payment and accompanying risk flow to the consumer.

Usually marketing follows a fairly well established channel from producers to consumers; Mendoza (1995) defined marketing channel as the path goods follow from their sources of original production to their ultimate destination for final use. Hence, the analysis of marketing channels is intended to provide a systematic knowledge of the flow of goods and services from their origin (producer) to their final destination (consumer).

2.3 Conceptual Framework

The focus of value chain framework is developing an effective way of coordinating the hierarchical stages in the value chain to meet consumer demand in an efficient manner. Effective vertical coordination of value chain stages requires partnership, actor interactions, information flow along the chain and coordination of the activities of chain actors. Hence, the competitiveness of a value chain is greatly influenced by the partnership and collaboration for innovation that can be realized by chain actors. Moreover, the development and operation of enabling and supportive business development services (e.g. market information, transport, credit) play critical role in how well the value chain responds to consumer demands. (Anandajayasekeram and Berhanu, 2009 cited by Mullugeta, 2018)

Figure. 1: Conceptual framework of kocho and bulla



Source: Own design, 2019

CHAPTER THREE

METHODOLOGY

This section of the thesis discusses research methodology (Quantitative & Qualitative) implemented in the research. These are description of the study area, the research design and approach, sources of data, samples and sampling procedures, and data collection, analysis and interpretation methods. Econometric analysis, definitions of variables and their expected signs are also treated in this chapter.

3.1 Introduction

3.1.1 Description of the study area

This study is based on examining the contribution of women in Enset value chain and its determinants in rural households of the Abeshge Woreda, Gurage zone. Abeshge Woreda is one of the Woredas in Gurage Zone of Southern Nations, Nationalities, and Peoples' Regional State (SNNPRS). Abeshge is bordered on the south by the Wabe River which separates it from Cheha, on the west and north by the Oromia Region, and on the east by Kebena. It was part of former Goro Woreda (CSA, 2007).

3.1.1.1 Demographic characteristics of the study Area

Based on the (2007) census conducted by the CSA, this Woreda has a total population of 61,424, of whom 32,450 are men and 28,974 women. The Woreda is categorized as rural. Most inhabitants (50.8%) are followers of the Ethiopian Orthodox Church while the remaining 31.96%, 15.82% and 1.28% belong to the Muslim, Protestant and Catholic faith.

3.1.1.2 Socio-economic characteristics of the study Area

Abeshge Woreda has a total of 26 rural kebeles. From those, 14 kebeles grow Enset and a mixture of different food and cash crops while the remaining 7 kebeles are predominantly Enset growing which they used for both consumption and for marketing.

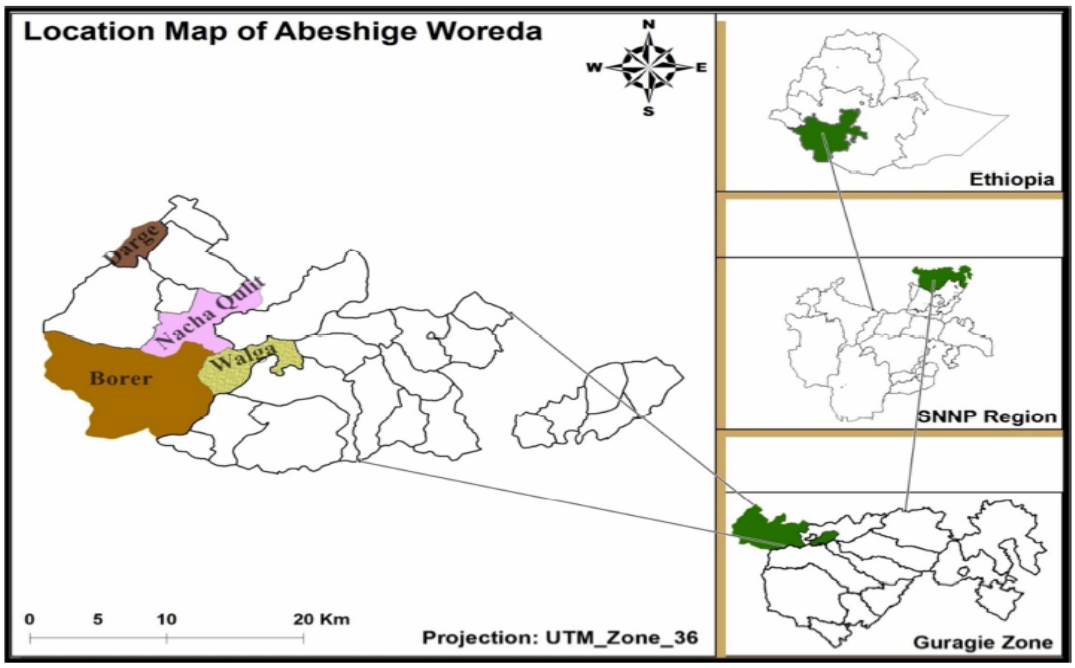


Figure 2: Geographical location of the study area (*Adopted from Dissie M. et. al, 2017)*

3.2 Research Design and Approach

This study used a mixed research approach in which both qualitative and quantitative data collection and analysis methods were employed.

3.3 Data Source and Method of Data Collection

3.3.1. Data Source

Primary and Secondary Data Sources and Instruments

Primary data were collected from Enset producers, heads of households, heads of villagers and communities, local buyers, wholesalers and retailers using questionnaire. Data were also collected using the following instruments.

- Key Informant interview (KII): Heads of villages and communes, Regional Agricultural Heads and offficers using checklist.

- Focus Group Discussion (FGD): Producers, Local authorities and other related stakeholders, to share some information relevant to enset value chain using semi-structured questionnaires;
- Observation:
  Secondary data were collected from Gurage zone, Abeshege Woreda Agriculture and Natural Resource Office reports, Central Statistical Authority, etc.

3.4 Sample Size and Method of Sampling

Samples were drawn from the population and taken based on what was indicated in the sampling frame. Before deciding on the survey areas, preliminary information was obtained from the study area and discussions held with the Abeshge Woreda Agriculture and Natural Resource Office (AWANRO).

Abeshge Woreda has 26 kebeles. Of them, 7 kebeles were purposively selected based on the Enset growers and traders among the other kebeles. Of the 7 kebeles, 2 kebeles selected. Namely Lay Geraba and Boketa. Based on the advice of experts and informants from the woreda Natural resource and agricultural office, households selected and local traders, retailers, wholesalers and village leaders were purposively and equal number of sample respondents selected for the study.

As regards the number of households, Lay Geraba had 359 while Boketa had 424 bringing the total to 783. The level of precision used by the study was ±7%. This percent of sampling error was employed to complete the study within the time available.

Sample size of households was determined using a simplified formula provided by Yamane (1967:886) as follows.

$$n= \frac{N}{1+N(e)2}$$

Where, n= sample size of the respondents

N= Total number of Households in the two selected enset producer kebeles.

e = margin of errors/level of precision. The level of precision is the range in which the true value of the population is estimated to be; it is expressed in percentage points (±7); based on this sample size on this study will be 154.

Table 1: Sample distribution in the selected 2 sample rural kebeles

Woreda's Name	Name of Kebeles	Total number of households in kebeles	Number of sample households
Abeshge	Boketa	424	77
	Lay Geraba	359	77
Total		783	154

Source: Abeshge woreda Agricultural and Natural Resource Office, 2019

3.5 Method of Data Analysis and Interpretation

3.5.1 Descriptive statistics

The data collected from the sample Enset producers and traders were analyzed using descriptive statistics which included mean, standard deviation, frequency, and percentiles. Therefore, the study adopted tools that allowed researchers to look at who does what, who has access to what resources, what the rules are and power differences between men and women and how these affected adoption of post-harvest technologies as well as ability to benefit from value chain and new market opportunities.

3.5.2 Analysis of Kocho & Bulla value chain performance

Estimation of the marketing margins was the best tools to analyze performance of the market. Marketing margin was calculated by taking the difference between Enset producer and consumers prices. Analyses of Enset value chain performance were done using market share and gross margin analysis. The producers share is the commonly employed ratio calculated mathematically as, the ratio of producers' price to consumers' price.

Analysis of Enset value chain performance was done by using the commodity sub-system approach based on market cost and margin devised by Mendoza (1995).

Mathematically, producers' share can be expressed as:

$$Ps=\frac{Pp}{cp}=1-\frac{MM}{Cp} \quad (1)$$

Where: PS= Producer's share

Pp= Producer's price

Cp = Consumer price

MM = marketing margin

Where in the present case Pp the producers' price is for *Kocho* or *Bulla*, Pr is the retail price of *Kocho* or *Bulla, i.e*. the consumer price, and MM is the marketing margin. Simple leaner regression model was used to analyze the determinant factors that affect the production of Kocho, bulla and income.

Marketing Margin (MM) was calculated at each marketing node along the Koch & Bulla value chain. The following mathematical relationship was employed.

$$MM=\frac{Gross\ marketing\ margin-Marketing\ Cost}{Consumer\ Price}x100 \quad (2)$$

Calculating the total marketing margin was done by using the following formula. Computing the Total Gross Marketing Margin (TGMM) is always related to the final price paid by the end buyer and is expressed as a percentage (Mendoza, 1995)

$$TGMM-\frac{Consumer\ price-Producer\ price}{Consumer\ price}X\ 100 \quad (3)$$

Where, TGMM=Total gross marketing margin.

Net Marketing Margin (NMM) is the percentage over the final price earned by the intermediary as his net income once his marketing costs are deducted. The equation tells us that a higher marketing margin diminishes the producer's share and vice-versa. It also provides an indication of welfare distribution among production and marketing agents.

$$\text{NMM}=\frac{Gross\ Marketing\ Margin-Marketing\ Cost}{Consumer\ price}X\ 100 \qquad (4)$$

From this measure, it is possible to see the allocative efficiency of markets. Higher NMM or profit of the marketing intermediaries reflects reduced downward and unfair income distribution, which depresses market participation of smallholders. An efficient marketing system is where the net margin is near to reasonable profit.

To find the benefit share of each actor the same concept was applied with some adjustments. In analyzing margins, first the Total Gross Marketing Margin (TGMM) was calculated. This is the difference between producer's (fisher men) price and consumer's price (price paid by final consumer) i.e.

TGMM = Consumer's price – Fisher men's price

Then, marketing margin at a given stage 'i' (GMMi) was computed as:

$$\text{GMMi}=\frac{SPi-PPI}{TGMM}X\ 10 \qquad (5)$$

Where, SPi is selling price at i^{th} link and PPi is purchase price at i^{th} link.

Total gross profit margin also computed as:

TGPM=TGMM-TOE (6)

Where, TGPM is total gross profit margin, TGMM is total gross marketing margin and TOE is total operating expense.

Similar concept of profit margin that deducts operating expense from marketing margin was done by Dawit (2010) and Marshal (2011).

Then profit margin at stage "i" is given as:

$$GPMi=\frac{GMMi-OEi}{TGPM}X\ 100 \qquad (7)$$

Where, GPMi =Gross profit margin at i^{th} link

GMMi =Gross marketing margin at i^{th} link

OEi =Operating expense at i^{th} link

TGPM=Total gross profit margin

3.6 Econometrics Analysis

Stata13 econometric software package was employed to analyze the data. Econometric models were used to explore the Enset market supply and the determinants of market outlet choice of the producer discussed as follows.

3.6.1 Market supply model

In this study, multiple linear regression models were used to analyze factors affecting kocho and bulla supply to the market in the study areas since all producers participate in kocho and bulla sales market. This model is also selected for its simplicity and practical applicability (Greene, 2000). Econometric model specification of supply function in matrix notation is given by the following relationship:

$$Y = \beta_0 + \beta_1 AGFM + \beta_2 SEX + \beta_3 ATRN + \beta_4 EXTS + \beta_5 MRACKS + \beta_6 AMIN + \beta_7 SHARV + \beta_8 USMT + \beta_9 DIST + \beta_{10} CRDT + \beta 11 TFSLD + SGEAR\varepsilon \quad \text{.....(3)}$$

Where:

Y = quantity of kocho & bulla supplied to market AGFM, SEX,…. are explanatory Variables that are defined under model Specifications.

β= a vector of parameters to be estimated

U = disturbance term

3.6.2 Market outlet choice model

To identify factors affecting market outlet choices decision of kocho and bulla producers at the individual household level, multivariate probit model was used. The multivariate probit model is an extension of the probit model and is used to estimate several correlated binary outcomes jointly. Generally, the multivariate probit model can be written as:

M equation multivariate probit model:

$Yim^* = \beta m`Xim + \varepsilon im$, $m = 1, \ldots, M$

$Yim = 1$ if $yim^* > 0$ and 0 otherwise

εim , $m = 1, \ldots, M$, are error terms distributed as multivariate normal, each with a mean of zero, and variance-covariance matrix *V,* where *V* has values of 1 on the leading diagonal and correlations P*jk* = P*kj* as off-diagonal elements, Where (m= 1... k) represent the dependent variable of Enset market outlet selected by the i^{th} farmer. (i = 1… n). The dependent variables are polychotomous variable indicating whether sales are made through the relevant marketing outlet. The outlet was aggregated into three groups: wholesalers, retailers, and consumers. Each farm can use one or more marketing outlet. Xim is a 1 × k independent variable that affects the choice of marketing outlet decisions and βm is a k × 1 vector of unknown parameters to be estimated εim, m = 1, …, m are the error terms distributed as multivariate normal, each with a mean of zero, and variance covariance matrix V, where V has values of 1 on the leading diagonal and correlations.

The aforementioned equation is a system of m equations shown in the following equations:

$Y^*_1 i = \beta'_1 X_{1i} + \varepsilon_{1i}$

$Y^*_2 i = \beta'_2 X_{2i} + \varepsilon_{2i}$

$Y^*_3 i = \beta'_3 X_{3i} + \varepsilon_{3i}$

The latent dependent variables are observed through the decision to adopt or not (yki) such that:

$yim = \begin{cases} 1 \\ 0 \end{cases}$ if $yk^* > 0$ k=1,2,3 otherwise

There are six joint probabilities corresponding to the six possible combinations of choosing and not choosing each of the three outlets. The probability that all three components of the kocho and bulla market outlet have been selected by household 'i' is given as:

$\Pr(y1i = 1, y2i = 1, y3i = 1) = \Pr(\varepsilon_{1i} \leq \beta'_1 X_{1,} \varepsilon_{2i} \leq \beta'_2 X_{2i}, \varepsilon_{3i} \leq \beta'_3 X_{3i})$

$\Pr(y1i = 1, y2i = 1, y3i = 1) = \Pr(\varepsilon_{3i} \leq \beta'_3 Xi_{3,} \varepsilon_{2i} \leq \beta'_2 X_{2i}, \varepsilon_{1i} \leq \beta'_{1i} X_{1i})$

$\Pr(y1i = 1, y2i = 1, y3i = 1) = Xpr(\varepsilon_{2i} \leq \beta'_2 X_{2i}, \varepsilon_{1i} \leq \beta'_{1i} X_{1i})$

This system of equations is jointly estimated using maximum likelihood method. The estimation is done using the user-written STATA mvprobit procedure (Cappellari and Jenkins, 2003) that employs the Gewek-Hajivassiliour-Keane smooth recursive conditioning simulator to evaluate the multivariate normal distribution (Train, 2003). The GHK simulator was indicated (Cappellari and Jenkins, 2003) to have desirable properties in the context of multivariate normal limited dependent variables that the simulated probabilities are unbiased, they are bounded within the (0, 1) interval, and the simulator is a continuous and differentiable function of the model's parameters.

The data covered information necessary to make household level indices of social, economic, demographic, and institutional indicators comparable across different categories of kocho and bulla market outlets choice at the individual household level.

- Structure like a SUR model but depvars are binary (and need not have same set of *X* in every equation).

- *M* different choices at a point in time OR choices on one item at *M* points in time (panel model with free correlations). Econometric analysis of the data was done with Stata 13 software.

3.6.3 Regression diagnostics

The econometric model estimation was supported by appropriate diagnostics. Data were tested and corrected for potential influential outliers. A test for availability of heteroscedasticity was also being carried out and appropriate estimation mechanisms employed.

Variance inflation factors (VIF) technique was employed to detect multicolinearity in explanatory variables. According to Gujarati (2003) VIF (Xj) can be defined as:

$$\text{VIF (xj)} = \frac{1}{1-Rj2}$$

Where, Rj is the multiple correlation coefficient between Xj and other explanatory variables. Where there was heteroscedasticity problem in the data set, the Breusch-Pagan test of heteroscedasticity was employed for detecting heteroscedasticity in this study.

3.7 Hypothesis, Variable Definitions and their expected Signs

The dependent variable was used in this research, the volume of Enset sale and Marketing Outlet whereas, the independent variables, those which the study was used for the production of kocho and bulla on the study area.

3.7.1 Dependent Variables

In this study the dependent variables were:

1. **Volume of Enset Sale (VoES): -**

   It is continuous dependent variable used in the multiple linear regression model equation. It is measured in kg and represents the actual supply by the farmer household to the market in the survey year.

2. **Marketing Outlet (MOUT): -**

   Marketing Outlet (MktO): In the analysis it was measured by the probability of selling kocho and bulla to either of the markets. The outlet choices might be along farmers' decision involved in three alternative markets. It is represented in the model as Y_0 for households, who choose to sell kocho and bulla mainly to wholesalers, Y_1 for producers that mainly sell their kocho and bulla to retailers and Y_2 for producers who mainly sell kocho and bulla for consumers (income earning from sale of kocho and bulla).

3.7.2 Independent Variables

The independent variables used in this research were:

Land size of household (LAND): it was a continuous independent variable and measured by the number of hectares of farm land owned by a farmer who is head of a household. It is hypothesized that the larger the size of the farm the higher annual increase in the income of a household.

Amount of kocho/ Enset produced (AKProd): it is a continuous independent variable measured in terms of kilograms. It is hypothesized that there is a positive relationship between the size of an Enset plant and the number of kgs of Kocho it produces.

Amount of Bulla Produced (ABProd): it is a continuous independent variable measured in terms of kilograms. It is hypothesized that there is a positive relationship between the size of an Enset plant and the number of kgs of Bulla it produces.

Age of farm household participating on Enset production and marketing (age): It is a continuous independent variable which is measured in years. The older a farmer is the better the experience and the more the production and marketing of Enset.

Family size of Enset producer household head (Famsize): It is a continuous independent variable measured by the number of members each family holds. It is hypothesized that the larger the family, the more the labor force and the more the produce.

Education level of Enset producer household head (Educ): it is a dummy variable measured in terms of 0 for Non-formal education and 1 otherwise:

Distance to Nearest Market (DNM): It is the location of the producer household from the nearest kocho and bulla market and is measured in kilometer**.** The closer the kocho and bulla market to producer household, the lesser would be the transportation charges, loss due to handling and better access to market information and facilities. Rural road improvement and nearness to market increases total acreage for crops and increases value of agricultural output.

Therefore, distance to nearest Enset product market is hypothesized to be negatively related to value addition.

Access to Enset production Extension Service (ACCEXT): This variable is measured as a dummy variable taking a value of Zero if the producer has access to kocho & bulla production extension service and zero otherwise. It is expected that extension service widens the household's knowledge with regard to the use of improved enset production technologies and has positive impact on enset market participation decision and volume of honey marketed (Holloway *et al*., 2000). Number of extension visits improves the household's intellectual capitals, which improves enset production. Therefore, frequency of extension is important.

Market alternative Price of Kocho and Bulla (PrKB): This is a continuous variable measured by the amount of Birr expended to buy a kg of Kocho and Bulla for household consumption per year on an average and market information. It is hypothesized that market information is related to whole sale marketing outlet and those Kocho and Bulla purchasers who obtain market information shift the market demand to expensive ones.

Kocho and Bulla Quality Preference (KBQlty): it is a dummy variable which is taking value of 0 if the buyer prefers fresh and 1 if the buyer prefers the processed one.

Kocho and Bulla supplied to the market to sell per household (market): it is continuous variable measured by kg and hypostasized to know the link of Kocho and Bulla supplied to the market per household producers with obtained income.

Processing Kocho and Bulla by household (processing): It is a dummy variable and measured by level of participants. It takes zero for female participants and one for male in Kocho, Bulla and fiber processing. This helps to know the contribution of male and female in Kocho and Bulla processing.

Access to markets (AM)*:* It is continuous variable measured the distance of kocho & bulla producer households from the local market in hours of transportation time**.** The closer the market, the lesser the transportation charges, reduced walking time, and reduced other marketing costs, better access to market information and facilities.

Table **2**: Description of the dependent and independent variables used in the model.

Variable	Description	Type	Value
Dependant Variables			
HMEPr	Women contribution to Enset Production	Continuous	volume in Kg
HMESPK	Women contribution to Kocho and Bulla marketing	Continuous	volume in Kg
Independent Variables			
Kert	Land size in kert	Continuous	size in hectare
Kocho	Amount of Enset produces or output	Continuous	Amount in kg
Bulla	Amount of Bulla produces or output	Continuous	Amount in kg
Year(+)	Age of Household Head	Continuous	number of years
Number (+)	Family Size	Continuous	number of families
EDEPH(+)	Education level of Enset producer household head	dummy	0- Non-formal edu, 1- edu. formal
DNM (-)	Distance to Nearest Market	Continuous	distance in Km
ACCEXT(+)	Access to Enset production Extension Service	Categorical	0= No extension service nea by, 1. Possessed requi. 2. Avialiblity 3.don't have time to get 4. others
Price	Market alternative price of Kocho and Bulla	Continuous	Br/kg
Quality	Kocho and Bulla quality (Quality):	Limited response	0, high quality 1, middle quality, and 2 low quality.
Market	Kocho and Bulla supplied to the market to sell per household	Continuous	Amount in kg
Process	Processing Kocho and Bulla by household	dummy	0 - Female, 1- Male
AM	Access to markets	Continuous	Kilometer

CHAPTER FOUR
RESULT AND DISCUSSIONS

This chapter presents the results obtained from descriptive, value chain map, value chain actors market performance and econometric analyses. In the descriptive statistics; mean, percentages and standard deviation were computed in the process of examining and describing socioeconomic and demographic characteristics of Enset value chain actors. In the value chain analysis description of major Enset value chain actors, their functions relationships among them, to assess enset production and value chain, to identify determinates of enset products and value chain performance in the study area along Enset product value chain was done. The econometric analyses were employed to identify determinants of farmers' market outlet choices and value addition of *Bulla* and Kocho at farmer levels of the marketing value chain in the study area.

4.1 Descriptive Statistics

4.1.1 Demographic and socioeconomic characteristics of sampled households

Demographic and socioeconomic characteristics of the sample respondents are presented in Table 3. The number of sample respondents handled during the survey was 154. All respondents were female, who participated and responsible both in Enset production and marketing in the household, the average family size of sample households was 5.8 with the minimum and maximum of 1 and 12 in adult equivalent respectively (Table 3). The mean age of the sampled households is 50.43 which imply that there is high dependency ratio as the result depicts. The mean age of the respondent person of the households was 50.4, indicating that the responsible person for production and marketing of Enset in the household has good experience. As age is considered as a crucial factor since, it determines whether the household benefits from the experience of an older person or has to base its decisions on the risk-taking attitudes of younger farmers. Educational level also considered to contribute positively to Enset production and marketing. The average educational level of respondents was 2.62 in year of schooling with minimum of 1 and maximum of 5.In this study, experience in production of

Enset were also considered since, farm experience in general; farming experience in Enset production in particular is considered to positively contribute to the production and marketing of Enset from accumulated knowledge and skill. The results depict that the average farming experiences of respondents for Enset were about 1.6 year with standard deviation of 0.512. This shows family member who is responsible for Enset production and marketing have an intermediate experience level.

Table 3: Demographics and Socioeconomic characteristics of sampled households

Variable	N	Min	Max	Mean	Std. Dev
Age of respondent	154	35	75	50.43	7.736
Education level of respondent	154	1	5	2.62	1.539
Family size	154	1	12	5.84	2.356
Rate of experience with your neighbor	154	1	4	1.67	.512

Source: Own computation from survey data (N= 154)

The total sample size of farm respondents handled during the survey was 154. Of the total sample respondents, 81.82 % were male-headed households and 18.18 were female-headed in the two selected kebeles of the woreda. In terms of marital statuses of respondents, 75.9 were married, 0.65 %single, 7.7 % divorced and 15.58 were widowed. Religion distribution shows that 62.99 % of respondents are orthodox and 37.01 % were Muslim.

Table 4: Statistical test of dummy variables for demographic and socioeconomic Characteristics of samples

Variables	Items	N	Percent	$\chi 2$-test
Sex	Male	126	81.82	7.003
	Female	28	18.18	
		154	100.0	
Marital Status	Single	1	0.65	5.132
	Married	117	75.97	
	Divorced	12	7.79	
	Widowed	24	15.58	
Religion	Orthodox	97	62.99	11.1
	Muslim	57	37.01	

Source: Own computation from survey data (N= 154)

4.1.2 Production overview

From total respondents of 154 households, 63,981 kg of enset was produced in total. From this total production 11,535 kg of bulla was produced by sample respondents with average of 415.4 kg of enset and 74.9 kg of bulla per household in the selected kebeles. In those of the two kebeles almost all of sample households produce enset (100%) (Table 5). Enset producers personally have significance at greater than 10% significant level if they have access to infrastructure and other accessibilities in selected two kebeles of Abeshege woreda.

Table 5: Amount of Enset produced in 2018/19

Variable	N	Min	Max	Sum/ Total Production	Mean	Std.Dev	t-test
How many enset produced	154	0	800	63,981	415.4	156.159	32.397***
How many Bulla produced	154	0	200	11,535	74.90	41.792	22.242***

Source: Own computation from survey result, 2019

4.1.2.1. Trend of Enset Market

Regarding the trend of enset and bulla production, all of the respondents responded that the production of enset decreasing and there is food security problem in the study area. As shown in table 4. 66 respondents of the sampled households responded as enset production is decreasing.

Table 6: Trend of Enset Market

Kebele of respondents	Trend of price per unit of kocho/enset			
	Increasing	Decreasing	The same	Total
Boketa	22	34	21	77
Lay Geraba	37	32	8	77
	59	66	29	154

Source: Own computation from survey data (N= 154)

In addition to decreasing of Enset production during the field visit, the producers (women) reported that there is also enset disease, which is found in the inner part of the decorticated (scraped) leaf sheaths. It affects the production process and volume of product. It was a great loss for them that, enset took 5-8 years to mature and ready for production; but, the farmers have decided to avoid who have it, by using their indigenous knowledge that tried to tackle the disease from transmitting to other plant. They used an experience of burning the whole enset which has a symptom of disease that showed to dry. It was a great loss for the farmers. In addition, by taking this critical problem, the researcher raised this idea to Wolkite Zone agricultural and natural resource officer and he told that the office know the problem and tried to create a linkage with Wolkite University to control this disease by creating a research center and it is on progress. But there is no any finding declared till this current study completed.

4.2 Value Chain Analysis

4.2.1 Value chain channel of Enset producers in the study area

According to McCormick and Schmitz (2002), value chain mapping enables to visualize the flow of the product from conception to end consumer through various actors. It also helps to identify the different actors involved in enset value chain, and to understand their roles and linkages. Consequently, the current value chain map of enset value chain in Abeshge woreda was depicted below.

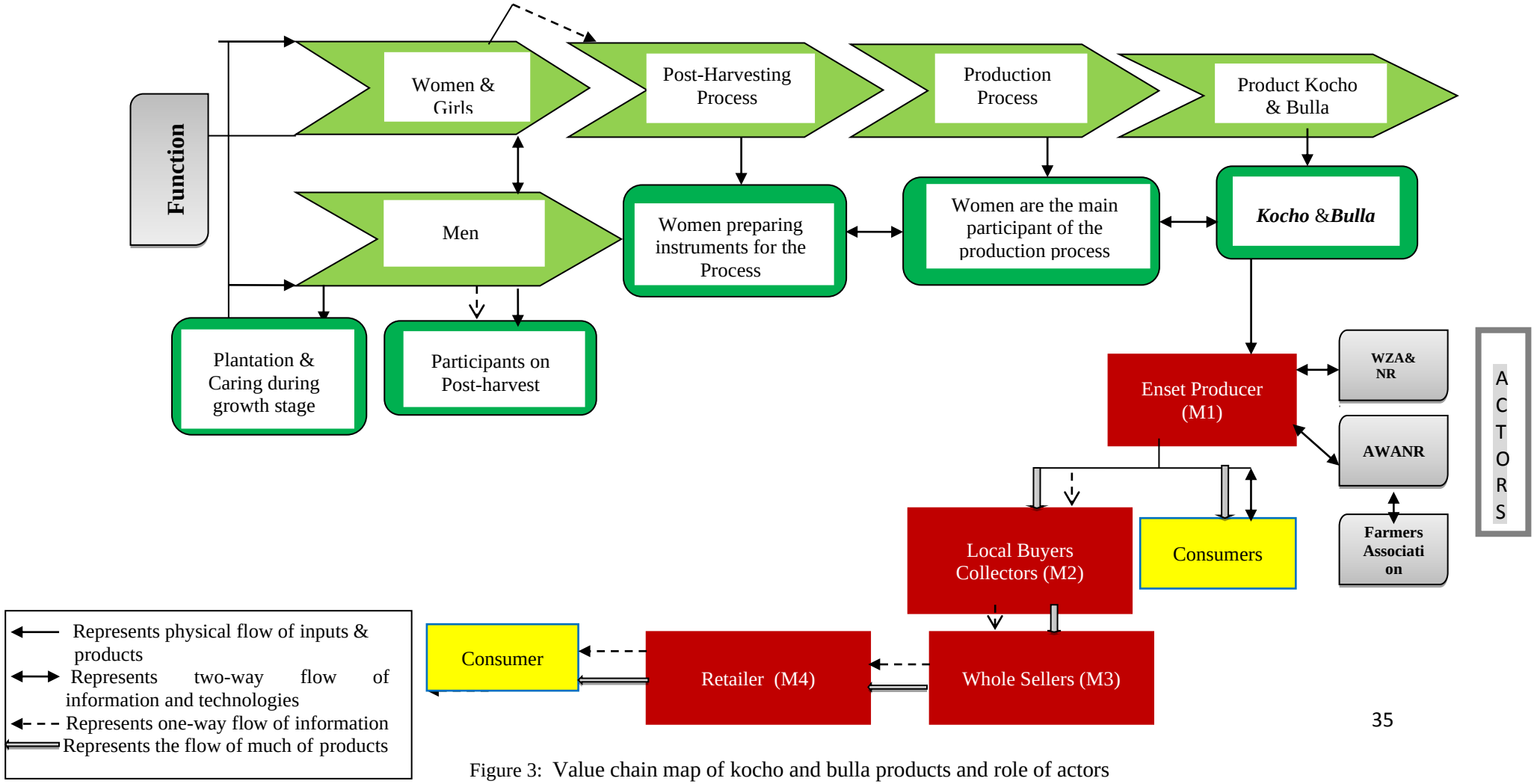


Figure 3: Value chain map of kocho and bulla products and role of actors

4.2.2 Actors, their role and linkage in enset value chain

The value chain highlighted the involvement of diverse actors who participated directly or indirectly in the value chain. According to KIT *et al.* (2006), the direct actors are those involved in commercial activities in the chain (input suppliers, producers, traders, consumers) and indirect actors are those that provide financial or non-financial support services, such as business service providers, government, cooperatives, researchers and extension agents.

4.2.2.1 Primary actors

The primary actors in Enset value chain in Abshege woreda were the farmers (enset producers), input suppliers, traders and consumers. Each of these actors add value in the process of changing product title. Some functions or roles are performed by more than one actor, and some actors perform more than one role.

Input Suppliers

Value chain analysis in agricultural activities commence in utilizing input supply level. In this stage of the value chain, there are actors who are involved directly or indirectly in agricultural input supply in the study area. Farmers themselves, district rural development agriculture and natural resource office and private input suppliers are the main sources of input supply. All such actors are responsible to supply agricultural inputs like improved seed varieties, manure (fertilizer) and farm implements, which are essential inputs at the production stage. However, the sampled farmer, use Enset seed and manure from their own sources. Labor is an important factor of agricultural production and it is employed in Enset production from land preparation to harvest. Respondents utilize both family labor and labor exchange as source of labor.

Producers

Enset producers are the major actors who perform most of the value chain functions right from the farm backyard inputs preparation on their production activities or procurement of the inputs from other sources to facilitate the production activities and marketing. The major value chain activities that Enset growers perform include plaguing, planting, fertilization, pest/disease

controlling, harvesting and post-harvest handling. Enset production in these 2 Kebeleswas based on rain fed agriculture. The farmers themselves or traders do post-harvest handling, independently with attaining activities like cleaning, cutting, packing, storing, transportation, loading and unloading. If *Enset* products are sold at the farm gate, the traders perform some of aforesaid activities. Most of the farmers use pits, underground storage and ground floor of their residential house as a store in both of Boketa and Lay Geraba *Kebeles*.

Picture 2: Planting after develop from enset

Diffused animal dung and house residuals through enset plant as a natural fertilizer

Decorticated enset putted on the pit for fermentation

Market Actors

Market actors like collectors, whole sellers, consumers and hotels/restaurants are the main identified actors in the study area. From observation made during survey period, most producers sold their products in the nearby local markets. The means of transportation varies among farmers but predominately producers use pack animals and vehicles. However, local collectors also go to the farmer's field, negotiate price, purchase it and ultimately transport mostly *Kocho* and *Bulla* products to urban markets. Farmers were also sold *Kocho* and *Bulla* to Collectors, wholesalers and consumers and processors (hotels and restaurants).

Retailers

Retailers are mainly involved in buying enset from the farmer directly in larger volume than any other actors and supplying them to whole sellers and consumers. They have a vehicle and they simply transport to the central market in Addis Ababa. Survey result indicates that collectors' markets are the main assemblage centres for kocho and bulla in their respective surrounding areas. They have better storage, transport and communication access than other traders. Almost all retailers take from warehouse of the farmer. They are located in Woliso, Wolkite and Addis Ababa.

Wholesalers

Wholesalers involvement in the chain includes buying of enset and bulla, transport to shops, grading, displaying and selling to consumers. Wholesalers are key actors in enset value chain in selected kebeles of Abshege district. They are the last link between producers and consumers. They mostly buy from collectors and sell to urban consumers. Sometimes they could also directly buy from the farmer. Consumers usually buy the product from wholesalers as they offer according to requirement and purchasing power of the buyers. Wholesalers come from areas and sell to urban consumers.

Enset and Bulla consumers

Consumers are those purchasing the products for consumption. Two types of enet and bulla consumers were identified: households and restaurants. Average income of 8 consumer respondents is 25,750 birr per annum. The private consumers are employees, urban and rural residents who purchase and consume enset with an average of 21.4% of their income per annum and purchase enset and bulla by 12.5 % of their income per month in Wolkite and Addis Ababa towns as the survey from purposely contacted 8 consumers result depicts. (Appendix table 8). Private consumers purchase enset and bulla directly from producers, collectors and wholesalers though most of the consumers purchase from collectors and wholesalers. Enset producers also make important segment of the rural consumers since they consume part of their products. The survey result also revealed that 63,981 kg of enset was produced and from these 11,535 kg bulla

produced by processing and value addition. As the survey result of consumers revealed 62 % Consumers prefer a well fresh, sanitized and well processed kocho and bulla.

4.2.2.2 Supporting actors

Such actors are those who provide supportive services including training and extension, information, financial and research services. According to Martin *et al*. (2007), access to information or knowledge, technology and finance determines the state of success of value chain actors. NGO`s, research centers and OoARD, primary cooperatives, micro finance Banks are main supporting actors who play a central role in the provision of such services.

1. **Financial services, Training and Extension Services**

   Supportive actors are those who provide dedicated services including training and advisory, information, financial and research services. According to Martin et al. (2007), access to market information or knowledge, technology and finance determines the state of success of value chain actors. The main supporters of the Enset value chain in the study area should be office of Agriculture and Natural Resource (OoANRD), marketing and cooperative development and Office of Trade and Industry, Wolkite University, and development agents since they are in nearby to them. But as the result depicts, in table 5, 55.2 % of the respondents lack extension service provision. In addition to this the producers of kocho and bulla from the surveyed two kebeles have no access to credit to their product. As the result in table 5 shows, 74 % the farmers got market information access from the extension agents.

   Supporting actors are 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 action, and the coordination of support activities. These actors also play a central role in the provision of enabling environments include the policies and infrastructure. From the broader perspective, agricultural focused policy of the country might be considered as supportive policy for proper functioning of Enset value chain development in the country in general and in study area in particular.

Table 7: Access to services by sample respondents

Variables	Respondents Response	N	%
Extension service	Yes	85	44.8
	No	69	55.2
Credit service	Yes	-	
	No	154	100
Access to market	Yes	114	74
information	No	40	26

Source: Own computation from survey result, 2019

4.2.3 Value chain governance

The significant value chain actors play facilitation role. They determine the flow of commodities and level of prices. In effect they govern the value chain and most other chain actors subscribe to the rules set in the marketing process. The study result indicates that the collectors and wholesalers are the key value chain governors. Due to the lack of a proper market information system and minimal bargaining power, producers are forced to sell their product at the price offered by traders. There is no vertical linkage between value chain actors but there is horizontal linkage between traders. In some cases, there are conflicts among the traders regarding payment. Overall, the governance of the kocho and bulla value chain is buyer driven with minimum trust between various actors. Traders are always complaining that the producers are not providing quality product while producers are accusing the traders for offering low prices. The producers are not organized and are not governing the value chain. Hence, they are price takers and hardly negotiate the price due to fear of post-harvest loss, in case the product is not sold. The value chain governance is similar in the two selected kebeles of Abshege woreda.

4.3 Marketing Channels and Performance Analysis

4.3.1 Marketing channels

A marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kolter and Armstrong, 2003). The analysis of marketing channels is intended to provide a systematic knowledge of the flow of the goods and services from their origin (producer) to the final destination (consumer). Since the marketing channels for *kocho and bulla* products are different, the analysis was carried out for *Kocho* and *Bulla* products separately. This section presents results for the identified marketing channels.

4.3.1.1 Enset/ Kocho marketing channels

In this study, three marketing channels are identified for *Kocho and bulla* of which two went out of the zone. Throughout the year as depicted above from, 63,981 kg production of enset 21,243 kg of enset was supplied by the sample farmers. From 11,535 kg of bulla production 3480 kg of bulla was supplied to the market. The channel comparison was made based on amount that passed through each channel.

Accordingly, channel I (the Producer-Collector-Wholesaler-Central market channel) carried the largest volume, 8,325 kg of enset with account 39 percent of the total volume marketed of Enset (*Kocho)*followed by channel II (Producer-Wholesaler –Consumer market channel) which carried a total volume of 6,249 kg which accounts 33.8 % of the total market of Enset (k*ocho).* Channel III, the Producers- Wholesalers-Consumer (Central market) is the third most important channel with 27.3 % of the total supply.

Channel I. Producers → Retailers→ Wholesalers→ (Central market) Consumer (39 %)
Channel II. Producers→ Whole Seller →Consumers (33.8%)
Channel III. Producers→ Retailer → Whole Seller →Hotel/Restaurants →Consumers (27.3 %)

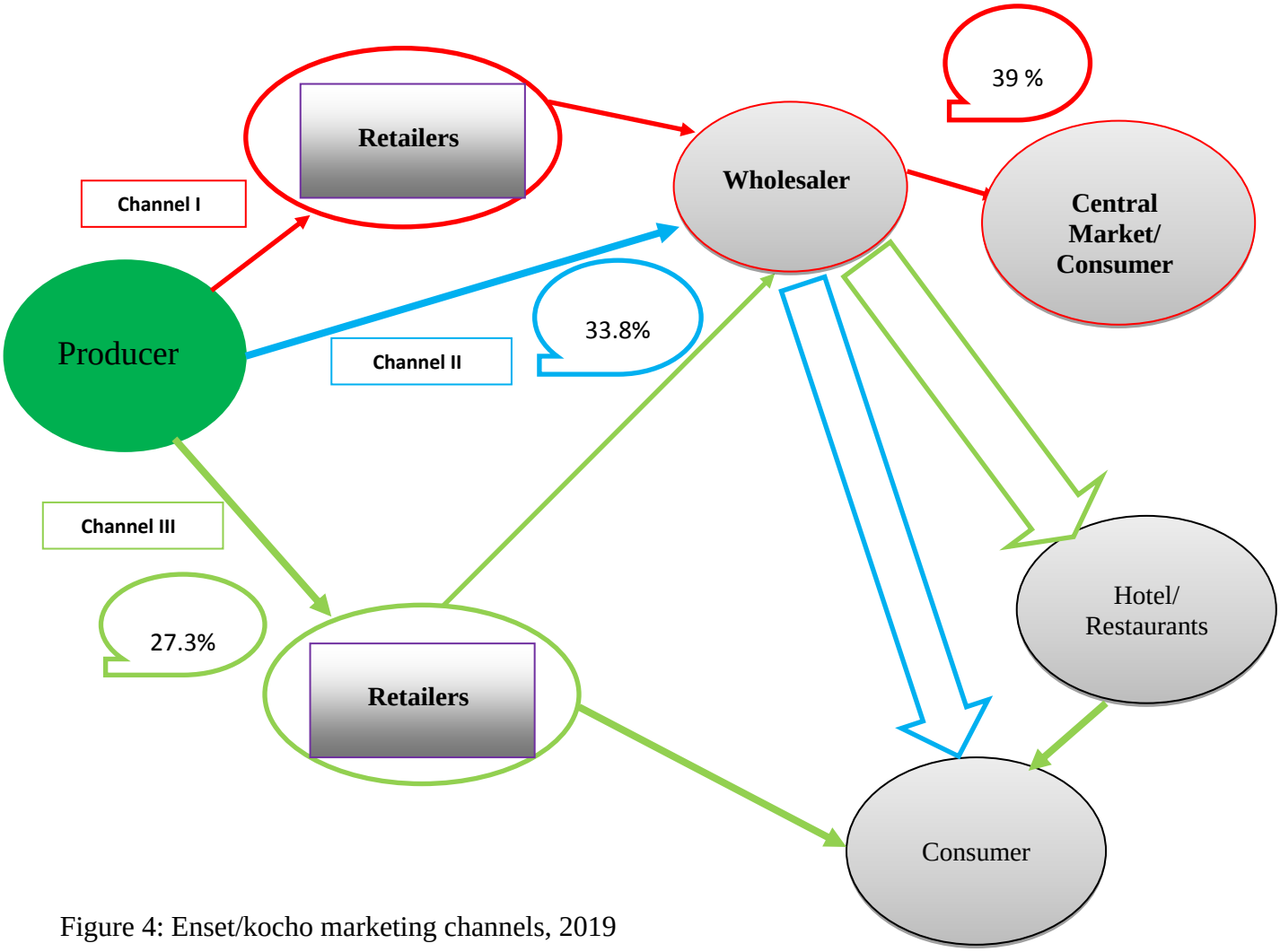


Figure 4: Enset/kocho marketing channels, 2019

4.3.1.2 Bulla marketing channels

In this study, three channels are identified for Bulla of which two went out of the zone. Through the year 2018/19 the sample farmers supplied 4030 kg of Bulla. The channel comparison was made based on amount that passed through each channel. Accordingly, channel I (the producer-Retailer-consumers market channel) carried the largest volume amounted to 1520 kg which is 44% of the total amount followed by channel II (Producers• ¨ Wholesalers ¨ (central market) which carried a total volume of 1235Kg of Bulla and is about 34% of the total marketed Bulla. While, Channel III Producers - Retailers - Wholesaler - Consumers market channel is the most

important marketing channel in terms of amount (1275 quintal) and account 33% through the market channel. (Figure 5).

Channel I. Producers → Retailers→ Consumer (44 %)

Channel II. Producers→ Whole Seller →Consumers (34%)

Channel III. Producers→ Retailer → Whole Seller →Consumers (33 %)

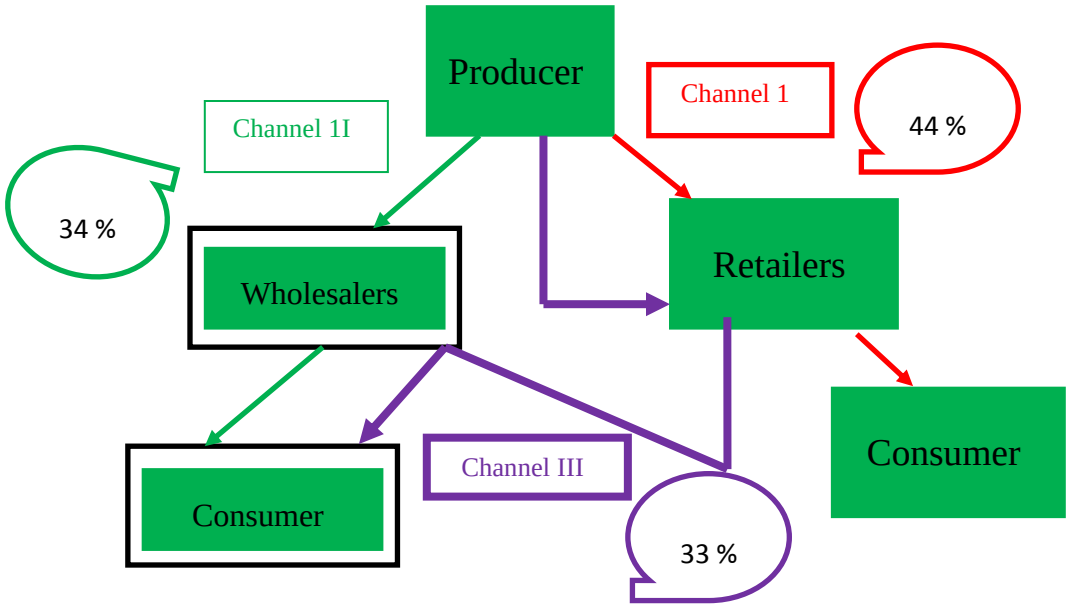


Figure 5: Bulla marketing channels , 2019

4.4 Performance of Kocho and Bulla market

The performance of kocho and bulla market was evaluated by considering associated costs, returns and marketing margins. The methods employed for analysis of performance were marketing margin. The analysis of marketing channels was intended to provide a systematic knowledge of the flow of goods and services from its origin of production to final destination (ultimate consumers). The estimated volume of production of both kocho and bulla were about 63,981kg and from out of this 11,535 kg of processed kocho and bulla produced.

The distribution of costs and gross income at different levels is important in the business of kocho and bulla. Being highly perishable, fresh enset require greater attention during harvesting, processing, packaging and transporting from the point of production to the final market. The marketing cost of the enset mainly involves the cost of post-harvest activities incurred before reaching the consumer. This includes cost of post harvesting (material costs), handling (cleaning, processing and packing). Generally, these components constitute a large share in the total margin between the final traders' price and the cost of production. The margin calculation is done to show the distribution throughout the various actors as kocho and bulla move from production to collectors, wholesalers and finally to consumers. Marketing margin can be used to measure the share of the final selling price that is captured by a particular agent in the value chain. The relative size of various market participants' gross margins can indicate where in the marketing chain value is added and/or profits are made. In order to calculate the marketing margin of an agent, the average price of kocho and bulla for that particular agent was taken. For instance, the buying price of consumers was obtained by taking the average purchasing price of consumers. In order to measure the market, share of each agent, the marketing channel where all agents have participated was selected. Marketing margins, associated costs and benefit share of value chain actors and marketing margins through different main channels was presented below.

4.4.1 Kocho market performance

Marketing costs and benefit shares of actors in Enset value chain Table 6 indicates, different types of marketing cost related to the transaction of enset by key market chain actors and the benefit share of each marketing actors. The arrangement of marketing cost revealed that perishability loss is the highest cost for each marketing agents is not possible to deliver it to markets that are located far from the production points, due to its perishable nature. Thus, the cost of loss is the highest amount followed by packing material cost.

4.4.2 Cost and profitability analysis of Kocho for producers, retailers and wholesalers

This section of the study focused on activities related to enset production at the farm site and marketing performance of the chain actors that shows a signal about the performance for enset and bulla market. Thus, the production cost and cost of loss is the highest costs in the marketing

cost of producers' side. Average costs and sales prices of the producers, retailers and whole sellers were used (Table 7). Concerning cost and profitability analysis of the sample enset wholesalers in the sample traders, as the table below clearly shows wholesalers were profitable. This indicates that wholesalers obtain a profit of ETB 19.05 per kg at sale level which was higher when compared to retailers. Relating to cost of operation of wholesalers, rent for shop is the highest (2.35 birr per kg) followed by transportation cost (0.20 birr per kg).

Marketing costs and benefit shares of actors in Bulla value chain Table 6; indicates different types of marketing cost linked to the transaction of bulla by fundamental market chain performers and the benefit share of each marketing actors. The arrangement of marketing cost has shown that perishability is the maximum cost for producers. This is due to the perishable nature of the bulla. Thus, the cost of loss is the highest amount followed by packing material cost. This shows a hint about the performance for bulla market. Thus, the cost for perishability and of the bulla is the highest costs in the marketing cost.

Regarding cost and profitability analysis of wholesalers in the sample traders, as the (Table 8) clearly shows wholesalers were profitable. This indicates that wholesalers can obtain a profit of ETB 25 per kg at wholesale level which was higher when compared to retailers and producers by 16 and 11 birr of retailers and producers respectively. Concerning to cost of operation of wholesalers, rent for shop is the highest 2.30 birr followed by transportation cost (0.50 birr).

Table 8: Kocho & Bulla marketing costs and benefit shares for producers, retailers and wholesalers.

Costs	**Cost of enset production activities (birr) per kg in year (2017-2019**					
	Kocho / Enset			Bula		
	Producer	**Retailer**	**Whole Seller**	**Producer**	**Retailer**	**Whole Seller**
Production cost =I	3.95			2.5	-	
Purchase Price	-	10.5	12	-	15	15
Marketing cost	3.95	1.05	2.95	-	-	-
Labor cost	-	0.30	-	1	0.50	-
Loss	-	0.25	-	1.25	-	-
Cost for packing	1.00	-	-	1	-	-
Transportation cost	2.00	0.50	0.20	0.50	0.25	0.50
Interest payment	-	-	-	-	-	-
Tax paid (ToT) Paid	-		0.15	-	-	0.15
Rent of shop	-	-	2.35	-	-	2.30
Other cost	-	-	0.25	-	0.25	0.20
Total marketing cost = II	10.5	-	0.6	2.5	1	3.15
Total cost =III	3.95	1.05	2.95	3.75	16	18.15
Av.Yield of enset (kg / year)	415.4		-	74.9	-	-
Av. market price of enset at farm gate (birr)	8.55	-	-	10	-	-
Gross sales (enset sale birr /kg) =IV	10.5	18	22	15	25	40
Marketing margin = IV-I	6.55	7.5	10	12.5	10	15
Profit margin =IV-III	6.55	16.95	19.05	11.25	9	25

Source: Own computation from survey result, 2019

As table 8 depicts; cost and profitability analysis of enset for 2018/19 G.C production year in the study area was as much as possible not satisfactory regarding its profitability. This shows that kocho and bulla producer with 415.4 kg average annual productions of kocho and bulla with average market price of kocho 6.55 Birr; on farm the farmer generates profit margin of ETB 8.55 /kg. With regarding to the cost items labor, transportation and packing cost shares 0.95,1 and 2 ETB respectively. This profit is low with case of lack of transportation and market in nearby. The result of table 8 above shows that retailers acquired 16.95 birr per kg profit of enset. This indicates that the performance of marketing of enset for the specified year 2018/19G.C was showing a good profit when we compare with that of producers. The marketing cost and transportation cost incur the highest cost of 0.50 birr. Second cost incurred due to labor is 0.30.

As table 8 depicts; cost and profitability analysis of bulla for 2018/19 G.C production year in the study area was not satisfactory as regards to its profitability. This shows that bulla producer with 74.9 kg average annual productions of bulla with average market price of 15 Birr at farm gate were generate profit margin of ETB 11.25/kg. With regarding to the production the cost is not satisfactory to the farmer. There is loss of cost which account 1.25 birr due to lack of extension education on post-harvest loss and accessibility of packing material.

As table 8 shows, retailers achieved 9 birr per kg profit of bulla. This describes that the performance of marketing of bulla for the specified year 2018/19 G.C show less profit when we compare with that of bulla producers. The table also indicates that from marketing cost, labor costs incur the highest cost of 2.34 % and 1.87 % for transportation cost and profitability analysis of bulla for wholesalers is illustrated in the table 8 above. Average costs and sale prices of wholesalers also were undertaken.

4.4.3 Marketing margins

Marketing margins are the difference between prices at two market levels. The term market margin is most commonly used to refer to the difference between producer prices of an equivalent quantity and quality of a commodity. However, it may also describe price differences between other points in the marketing chain, for example, between producer and collectors, or

wholesalers and consumers, prices (Spencer, 1971). Therefore, for this section of the study by considering the average sales prices of different participants in enset value channel (enset producer, retailer and wholesalers); table 9 below summarized the different indicators of marketing margins for kocho value chain channel.

Table.9: Marketing and profit margins of kocho in 2019 G.C.

Items birr/kg	Producer	Retailer	Wholesaler	Sum of horizontal
Production cost	3.95	-	-	3.95
Purchasing cost	-	10.5	12	22.5
Marketing cost	3.95	1.05	2.95	7.95
Total cost	3.95	1.05	2.95	7.95
Gross sales price(birr/kg)	10	18	22	50
Market margin % share of margin	6.5	7.5	10.5	24.5
Profit margin %share of profit	26.53	30.6	42.8	99.9

Source: Own computation from survey result, 2018/19

Table 9 shows that 75.5 % of total gross marketing margin was added to enset price when it reaches consumer at the Addis Ababa, Wolkite and Woliso marketing centers by retailers and wholesalers. Out of the total gross marketing margin 10.5 % was gross margin of wholesalers, while 7.5 % was that of retailers.

TGMM (Complete distribution channel) 24.5 % GMM (enset retailers) = 10.5 %, GMM (Wholesalers) = 7.5 %, GMMP (producer's participation) (100% -24.5 % = 75.5 %)

4.4.4 Marketing and profit margins

Marketing margins is the variance of prices at two market levels. The term market margin is most commonly used to refer to the difference between producer prices of an equivalent quantity and quality of a commodity. However, it may also describe price differences between other points in the marketing chain, for example, between producer and wholesale, or wholesale and collectors, prices (Spencer, 1971). Thus, for this section of the study by bearing in mind the

average sales prices of different participants in bulla value channel (producer, wholesaler and retailer), Table 13, summarized the different pointers of marketing margins for bulla value chain Channel.

Table.10: Marketing and profit margin of bulla in 2018/19 G.C.

Items birr/kg	Producer	Collector	Wholesaler	Sum of horizontal
Production cost	2.5	-	-	2.5
Purchasing cost	-	15	15	30
Marketing cost	2.5	1	3.5	7
Total cost	3.75	16	18.15	37.9
Gross sales price(birr/kg)	15	25	40	80
Market margin % share of margin	12.5	24	36.5	73
Profit margin %share of profit	17.12	32.8	50	99.7

Source: Own computation from survey result, 2018/19

TGMM (Complete distribution channel) 73 % GMM (bulla retailers) = 36.5 % GMM (whole salers) = 24 % GMMP (producers' participation) 100% -73% = 27 %

Table 10 shows that 73 % of total gross marketing margin was added to bulla price when it reaches consumer at the Addis Ababa, Wolkite and Woliso marketing centers by retailers and wholesalers. Out of the total gross marketing margin, 36.5 % was gross margin of wholesalers, while 24 % was that of retailers.

4.5 Econometric Model Results

4.5.1 Results for Multiple Linear Regression Model

This section focuses on the results from the econometric analysis using multiple leaner regression model to identify the determinants for enset supply.

Enset is produced for market and consumption and important as income generating in Abshege woreda. According to the result of this study, all sample households are good suppliers of kocho and bulla to the market. Analysis of factors affecting farm level marketable supply of kocho and bulla was found to be important to identify factors constraining kocho and bulla supply to the market. The analysis was done separately. The numbers of kocho and bulla producers were 154. Multiple linear regression model were employed to identify the factors. For the parameter estimates to be efficient, unbiased and consistent assumptions of Classical Linear Regression (CLR) model should hold true. Hence, multicolliniarity, endogeniety and heteroscedasticity detection tests were performed using appropriate test statistics.

To start with, to check whether multicollinearity is present or not a simple correlation coefficient matrix was conveyed. Gujarati (2003) establishes a rule of thumb, which says that multicollinearity is a serious problem when the correlation coefficient is 0.8 or above. Thus, though correlation is present, multicollinearity is not a serious problem in our data (Appendix: 6). The command robust (in Stata) was used to correct for heteroscedasticity. There is no multicollinearity problem since VIF results are less than 10 (Appendix Table 7). But before estimation was done, data exploration is an important step.

To test the significance of the multiple regression model; F- test, the R^2 are used. The computation result for R^2 is 41 %, this results show that the models are statistically acceptable as 41.5 % of the variation is explained in the multiple regression model (table 11). The test that is used to confirm the validity of the all variables jointly estimation was F-test. The F-test shows that the model is significant at 1 percent level of significance showing that the overall model is a good fit and p value is too small, Prob> F = 0.0000. The calculated value is higher than the tabulated value at one percent significance level. Therefore, the F-test of goodness-of fit under

the null hypothesis that all parameters are zero can be rejected. Hence, our data fits the multiple linear regression models very well. (See table 11).

Table 11: Determinants of Kocho and Bulla quantity supplied to the market

Variable	Coef.	Std. Err.	t	P>|t|
Age (Age of enset producer)	-.9099747**	.5150431	-1.77	0.079
EduLevel (Education level of enset) producer	.2070339	2.649326	0.08	0.938
FamlSize	-3.179256	2.322056	-1.37	-1.37
NoOfWom	2.65333	2.526554	1.05	0.295
EnsProdInDay	9.628325	12.28202	0.78	0.434
AcsblTrn	15.73017	18.58902	0.85	0.399
Mrakc	5.644907	9.207774	0.61	0.541
HMEPr	.2581805***	.0448327	5.76	0.000
HMBPr	.2387773**	.1242041	1.92	0.057
HMLO	-3.443568	2.771648	-1.24	0.216
ExtContServ	-6.502558	8.617429	-0.75	0.452
RateOfExp	21.99996**	8.648039	2.54	0.012
_cons	-3.867215	53.77189	-0.07	0.943
Number of obs = 154	Prob> F = 0.0000			
Root MSE = 52.499		R-squared = 0.4151		
F(12, 141) = 12.28				

Source: Own computation from survey result, 2019

Note: Dependent variable is the amount of kocho and bulla soled in kg. ***, ** and * are statistically significant at 1%, 5% and 10%, respectively. Amount is an instrument for quantity of kocho and bulla supplied. In most econometric data particularly in cross-sectional data, we are more likely to encounter heteroscedasticity problem. Since our data is cross sectional by its nature we are likely to encounter with the problem of heteroscedasticity. To correct these problem robust standard errors were estimated.

4.5.2 Determinants of Kocho and Bulla market supply

Table 11 shows the different demographic and socio-economic factors of respondents on enset supply. The dependent variable is a continuous variable measured in kg per year. The findings of the multiple linear along with its test statistics are discussed below.

Age of respondent (Year): -the variable negatively affects and significant at less than 5 %level of significance. As age of the producer increased work force number of the farming family increased and produce more. In addition to these, as age of the producer's family is below ratio of work force, the number of work force or labor decreases.

Market Access (Mrakc): It affects marketed supply of kocho and bulla positively and significantly affect at less than 10% significance level. The amount of kocho and bulla supplied to the market increase by 5.6 quintal. This suggests that access to market increases motivation of enset producers towards their kocho and bulla production and channel choice. The closer the market, the lesser the transportation charges, reduced walking time, and reduced other marketing costs, better access to market information and facilities. The implication is that obtaining and accessing to market helps supply more quantity of kocho and bulla. This is in line with Abreham (2013) as the distance to the market center increases transportation cost increases; since cabbage is highly perishable and bulky product its loss and other marketing costs increased.

How much enset produced (HMEPr):-As hypothesized, the regression result shows that quantity produced significantly affected kocho and bulla quantity supplied to the market at 1% significance level. The result also implied that, a quintal increase in the quantity of kocho and bulla production has caused an increase of 25.8 quintal of marketable kocho and bulla. This is in line with Abay (2007); Adugna (2009) and Ayelech (2011) who illustrated an increase of tomato, mango, avocado and papaya production by farming households has augmented marketable supply of the commodities significantly.

How much bulla produced (HMBPr):-the variable positively affect at less than 5 % level of significance. The result also implies that, a quintal increase in the quantity of bulla production has caused an increase of 23.8 quintal of marketable quintal. This is in line with Abay (2007); Adugna (2009) and Ayelech (2011) who illustrated an increase of tomato, mango, avocado and

papaya production by farming households has augmented marketable supply of the commodities significantly.

4.5.3 Result for Multivariate Probit model

Multivariate probit model was used to identify factors affecting Kocho market outlet choice decision of the farm households. Wald test ($\chi2$ (154) =51.43, p=0.0878) is significant at less than 1% probability level. This result implies that the coefficients are jointly significant and the explanatory power of the factors included in the model is satisfactory.

Furthermore, results of likelihood ratio test of the model (LR $\chi2(10)$ =75.035, $\chi2$= 0.0000) is statistically significant at 1% significance level, indicating that the independence of the disturbance terms (independence of market outlet choice) is rejected and there are significant joint correlations for two estimated coefficients across the equations in the models. The correlation coefficients are statistically different from zero in 5 of the 14 cases, confirming the appropriateness of the multivariate probit specification and market choice outlets are not mutually independent. The results on correlation coefficients of the error terms indicate that there are complementarities (positive correlation) and substitutability (negative correlation) between different market outlet choices being used by farmers. The SML estimation results suggested that there was positive and significant interdependence between household decisions to choose consumer and retailer. The SML estimation results also suggested that there is negative and significant interdependence between household decisions to choose retailers outlet and wholesaler outlet; retailer outlet and consumer outlet (Table12).

The result of multivariate probit model shows that the likelihood of households to use wholesalers, retailers and consumers market outlet for Kocho were 58.4 %, 55.8 %and 62.3 % respectively. The result also shows that the joint probability of using all outlet choice was 0.0013577 for success and 0.0676308 for failure of joint probability to use all outlets. As depicted in Table 12 out of thirty explanatory variables included in multivariate probit model, three variables significantly affected wholesaler market outlet, two variables significantly affected retailers market outlet; three variable significantly affected consumer outlet at 1, 5 and 10% probability levels.

Table 12 presents, the results of multivariate probit model. The result indicates that the correlation coefficients among the equations are highly significant, which means that the multivariate probit model is superior to the individual probit models. In addition, a likelihood ratio test rejects the restrictions implied by separate probit models for the three outlets. According to Fafchamps and Hill (2005), the correlation is positive between the wholesalers and the retailers but is negative between the wholesalers and the retailers' outlets as well as wholesalers and consumers. This suggests that farmers who start using an alternative chain to the wholesaler one are more prone to using another one. In this study the result shows that the three alternative channels wholesalers, retailers and consumers are negatively related. This suggests that there is an inverse relationship among the choice channels; when the farmers want to sell kocho and bulla if the price of consumer decreases the price of retailer and wholesaler may a prone choose to the farmer to earn a good income.

The amount of enset produced per day has negative effect and significant on both wholesaler and retailer whereas positively associated with producer. This indicates that the amount of enset produced per day affects the income of wholesaler while retailers gain profit as the amount of enset produced per day increased. Distance from the nearest market has positive and significant on both wholesaler, and retailers market outlet choice whereas has negative effect on consumer market outlet choice.

Access to market has positively associated and on both retailer and consumer market outlet though taking negative effect on consumer market outlet. As the market center is in nearby to the farmer the chance to access retailer market outlet is better and benefited. In the consumer side as the market center is far they lack to access the product. This indicates that households who are closer to market were assumed to have more probability to choose wholesalers and consumers outlet whereas household who are far from the market were expected to be associated with sales to the retailer market outlet Fafchamps and Hill (2005). This is may be due to the reason that as the distance to the market center increases transportation and other marketing costs increased.

Number of women participated (NoOfWom): the number of women participated in the production of enset and bulla was positively associated with retailer and consumer at significant level of 10 % significance level. Women's plays crucial role in production process of kocho and bulla; after producing enset through value addition bulla will be produced.

Number of women participated in kocho and bulla production negatively affect retailer and significant on both retailer and consumer market outlet with positive association to consumer. This implies that as amount of women participated in production process of kocho and bulla the amount supplied to the market become high. Thus as the amount of kocho and bulla supplied to the market increased consumers become benefited.

Amount of enset produced per day (EnsProdInDay): it is hypothesized, amount of kocho and bulla produced negatively influence both wholesaler and consumer with positive association to retailer. Significantly influence at less than 1 %.

Value addition to bulla (VAdB): It has a significant and positive relationship with likelihood of choosing wholesalers outlet at 1 % and 1 % significant level. Value addition on bulla negatively influences both retailer and consumer. This result shows that bulla producers who add more value would more likely to choose wholesaler market outlets. This result is consistent with the findings of Abraham (2013) that showed that post-harvest handling is negatively and significantly related with producer market outlet. Post-harvest value addition practice will increase the probability of households‟ decision to sell Kocho to consumer and processors marketing channels and will decrease the probability of households‟ to choose wholesaler and retailer's outlet. The reason may be selling to consumer and retailer market outlet requires transporting the product to urban centers, who seek better quality and farmers secure better price than retailers and consumers market outlet.

Access to Market Center (MrktCent): - The likelihood of choosing wholesalers and consumer market outlet was positively and significantly affected by kocho and bulla at 1% and 5% level of significance respectively. Lack of market access in nearby negatively influence consumers market outlet. This means that large number of the farmer preference increases the likelihood of selling kocho and bulla to wholesalers and consumers market outlets.

This is due to the fact that wholesalers buy in large volume relative to other market channels for making proper benefit. The result is consistent with Nuri (2016) who indicated that large quantity of bulla increases the likelihood of selling bulla to wholesalers' market outlets.

Family size (FamlSize): -The likelihood of choosing retailers market outlet was negatively and significantly affected by family size at 5% significant level. This result shows that farmers having more family size would less likely sell kocho/bulla to retailers compared to those household who had less family size. The possible reason might be as household size increase, consumption level increase, which in turn decrease quantity supply. Therefore, as the quantity supplied is small, they would not prefer retailer outlets rather they will prefer wholesaler or consumer.

Access to transport (AcsblTrn): -Influenced the choice of consumer's outlets positively at 10% level of significance. Farmers having own transport facilities are more likely to choose consumer market outlets and less likely to choose other market outlets. This might be due to the reason that, farmers who have transport facility could supply their product to urban center and sale to consumer directly by getting better price, which might go to other outlets. This shows that the availability of transportation facilities helps to reduce long market distance constraints, offering greater depth in marketing choices. This result is in line with that of Fikru *et al*.(2017) who found that owning transport facilities influenced the choice of collector's outlet negatively and significantly. Thus, when we compare farmer who have own transport facility with the farmer who do not have own transport facility value addition per kilogram is higher (greater) by 1.37 and 1.60 birr for *Kocho* and *Bulla* respectively. This might be due to the fact that own transport facility reduces transport cost which in turn increase value addition. This finding is supported by that of Gebremedhin et al. (2009) who found that ownership of equines as a means of transport increased market participation because equines reduce marketing costs. In addition, this finding is in line with Nuri (2016) who indicate ownership of transport facility increase *Kocho* value addition.

Table 12: Multivariate probit results of the determinants of *Kocho* market outlet choice

Variable	Whole seller			Retailer			Consumer		
	Coef.	Std. Err.	Z	Coef.	Std. Err.	Z	Coef.	Std. Err.	Z
FamlSize	-.0791939 *	.06804	-1.16	-.148555**	.0694385	-2.14	.002604	.0740891	0.04
EnsProdInDay	-.4848816	.27995	-1.73	.1604505	.2662526	0.60	-.067471	.2643173	-0.26
NoOfWom	-.0328254	.06395	-0.51	.1204117**	.0667298	1.80	.110817*	.0653127	1.70
VAdK	.3916437	.36693	1.07	.0940808	.2863245	0.33	-.492367	.317376	-1.55
VAdB	1.343296**	.54877	2.45	-.050831	.4722398	-0.11	-.934751	6370792	-1.47
HMEPr	.001817	.00162	1.12	.0007926	.0017131	0.46	-.000976	.0015432	-0.63
ExtContServ	-.2145521	.22151	-0.97	-.065095	.2122351	-0.31	-.194282	.2044679	-0.95
AcsblTrn	-.4831434	.37489	-1.29	.239565	.3108641	0.77	.634027**	.3829468	1.66
MrktCent	.5424465**	.21714	2.50	.1872625	.2048347	0.91	-.602674***	.1987891	-3.03
QConsd	-.0015824	.00171	-0.92	-.001342	.0017621	-0.76	-.000127	.0016888	-0.08
QSdPr	.0384943	.03355	1.15	-.006220	.0325632	-0.19	-.012045	.0313457	-0.38
HMBPr	-.0030128	.00353	-0.85	.0006878	.0035381	0.19	.000314	.003415	0.09
HMLO	.0863861	.06971	1.24	.1013247	.0811794	1.25	-.106319	.074495	-1.43
_cons	.5040821	.96646	0.52	-.930228	.8882741	-1.05	1.20178	1.098185	1.09
	Wholesalers		Retailers		Consumer				
rho21 0.034 rho31 0.000 rho32 0.001									
Predicted probability Joint probability(success) .0013577 Joint probability(failure) .0676308									
Number of observations 154Number of simulations 5Log likelihood -244.4222 Prob > chi2 = 0.08780.000Wald chi2(39) = 51.43 Likelihood ratio test of rho21 = rho31 = rho32 = 0: chi2(3) = 75.035 Prob > chi2 = 0.0000									

Note: "Coef" and "Std. Err" represents coefficient and standard error respectively. "***", "**"&"*" represents 1%, 5% and 10% level of significance, respectively.

Source: own computation from survey result (N=154)

4.6 Value Chain Constraints and Opportunities

The Most important value chain constraints which affected the production of enset and its process, market and its actors along the chain were; lack of modern technology to support the farmers, there was no involvement of cooperatives to support the producer in the marketing of kocho and bulla products, poor linkage of actors in the value chain, inadequate institutional concerns which underestimate the producer to get comparable price from the sale of kocho and bulla. Lack of access to road also great influence, even though, the study area is not far from the main market center (Addis Ababa). Moreover, information obtained from the producers during focus group discussions, the existing extension service has failed on enset productivity and marketing which have no anyone to support on; lack of expertise on the field of enset plant and weak information flow among the chain actors. As Ashenafi et al.(2017), supported by his observation and identified the major issues in the supply chain of *Enset* product in Ethiopia were weak information flow, poor infrastructures and transportation systems, lack of links between producers and consumers and packaging problems. Market issues such as poor market policies, lack of market access and poor market facilities and warehouse services were critical.

Picture 3: *Focus Group Discussions with Women HHs about the production of enset & its Constraints*

Additionally, during focus group discussions with women and found out that constraint on transport and distance from the nearest market that holds the producer not chooses the best market channel. A woman gone to the local market, to sell kocho and bulla even though, the selling price was cheap. It is because of lack of transport access and rural road that they prefer to sell on the nearest market.

With all aforementioned constraints, there are also opportunities that can benefit enset value chain actors in Abeshge woreda. Among the opportunities, now a day's most of the Ethiopian cultural foods, made up of raw meat (kitfo) needs bread made up of kocho and also used complement with vegetables. The demand increasing, especially in Addis Ababa, which has more than 5 million dweller. In addition, the main road built by asphalt, the chain actors, specially the farmers can create an association to link with the central market (merkato), they can sale their product easily and maximize their profit accordingly.

As Henok T. (2018); found out that the rising of cereal prices also increase demand for *Enset* products as a cheaper substitute. If consumption increases, this can encourage increased *Enset* production and expand the pos itive impact that *Enset* has on Ethiopian food security. Moreover, the increase in awareness toward nutritional as well as medicinal value of *Enset* food products also creates additional demand.

CHAPTER FIVE
SUMMAY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary and Conclusion

This study aimed at investigating Enset value chain and its determinants of rural households in Abeshge woreda, Gurage Zone, Southern Ethiopia. The specific objective of this study were contain examining enset value chain options and actors performance, identifying determinates of enset supply to the market, finding out factors affecting market outlet choice decision and opportunities and constraints of enset producers along the value chain.

The survey implemented primary data collection by using questionnaire from 2 sample kebeles of 154 enset producer households proportionally and 10 traders, 15 consumers of kocho and bulla from two towns (wolkite and Addis Ababa) were interviewed through pre-prepared checklists. Key informants of Gurage zone agricultural office Head also done by using pre-tested structured schedule questionnaire and interview. This survey also got the secondary data from Wolkite agricultural and natural resource office and from published and unpublished resources to develop and support the findings. The methods of analyzing the data were descriptive statistics and econometric analysis to get determinant factors of enset along the value chain. Multiple Linear Regression model used to identify the determinant factors of kocho and bulla supply to the market. Multivariate tobit Regression model applied to analyze factors affecting market outlet choice of kocho and bulla selling in the study areas. The findings of this study are summarized as follows.

The two sampled kebeles of Abeshge woreda enset value chain actors are producers (suppliers), wholesalers and retailers. Regarding input supply, farmers themselves and private input suppliers are the main sources of input supply. Producers can seold their products either of the wholesaler or retailers at different levels. Wholesalers are mainly bought the product from local market and sold to consumer and retailers. Retailers are found in towns and the last market chain actors to collect from the wholesalers and sell to the consumers.

The findings of this study revealed that lack of adequate institutions, improved varieties, lack of government involvement in supply input and facilitating market of the product are the main production and market constraints. In addition,

The value chain analysis of kocho and bulla in the study area discovered that the main value chain actors are kocho and bulla producers, wholesalers, retailers and consumers. Kocho and bulla producers were the main actors who were involved in the production and input supply activities. Wholesalers purchase the products from the producers and sell to consumers and retailers. In addition to this the consumer also directly bought from the producers. Retailer purchases kocho and bulla from wholesalers and sell to end users/consumers.

Regarding value chain performance of the study area, lack of efficient processing devices and inefficient linkage of chain actors, the marketing got constraints in the process. On the other hand, the road constructed by asphalt specially the small towns near to the producers nowadays the price of cereals are increasing time to time, the dwellers increased the purchase of kocho and bulla, with this situation the price of the product increased and in the mean time the producers income increased, this is a good opportunity to them.

kocho and bulla producers in the study area supply their products to the market. To identify the determinates that affect the supply of their product to the market, multiple linear regression model used.

The result of the multiple linear regression model indicates that marketable supply of kocho and bulla is significantly affected by gender, age of the family member, access to market and distance to nearest market. Therefore, these variables require special attention if marketable supply is to be increased.

Kocho and bulla producers in the study areas supply their product through different market outlets. Producers were classified into three categories according to their outlet choice decision: those who have supplied most of their kocho and bulla product to the market. The multivariate tobit model was run to identify factors determining producers' market outlet choice decision. The model results indicated that the probability to choose the retailer outlet was significantly affected

by age of the producer, educational level of the producer, amount of kocho and bulla soled, and distance to the nearest market determined as the selection of retailers as market options. In addition to this sex of the producer, harvesting time and distance to the nearest market affect that of retailers. Access to market, harvesting time is determining choice of consumer outlet. In addition to this distance to the market considered as continuous and affect the choice of consumer outlet access to extension service, amount, access to market information, credit access and kocho and bulla soled compared to wholesale outlet. Similarly, the probability of choosing consumer marketing outlet was affected by age, amount of products sell and access to extension services compared to wholesale outlet. Therefore the above indicators require special attention for the producer that got from sell of the product and the improvement of their livelihood as well.

The other point raised in Focus Group discussions with women tells constraint on transport and distance from the nearest market that holds the producer not chooses the best market channel. A woman goes to and leads preferred the local market and sell kocho and bulla even though, the selling price is cheap. It is because of lack of transport access and rural road that they prefer to sell on the nearest market.

Furthermore, the study identified that amount of value addition and quantity of kocho and bulla supplied are important factors observed to influence the producer to choose the appropriate market outlets. When farmers add value, the quality and quantity of the demand for the product will increase which will in turn increase their probability of choosing appropriate market outlets for their benefit maximization.

5.2 Recommendations

The findings of this study need to recommend points that help to improve kocho and bulla production and efficient marketing system in the study area.

There are many actors involved and playing roles in kocho and bulla value chain in the study area. But their role was not as such effective to benefit the producers. It is because of weak and unproductive linkages of chains among the actors. In addition, there were also weak responsible body who is relevant direct responsible to the sector. On the other hand, promoting the development of kocho and bulla value chain is required. In particular, positive attitudes toward partnership, networking and learning need to be developed among main actors in the value chain to benefit the producer and to encourage on supporting the product regularly.

In the study area, farmers took trainings about increasing production and productivity. However, with the shortage of land size and population increment in a household level, farmers need to plant seasonal crops than perennial plant like enset. On the contrary the demand of kocho and bulla within the country especially, in many large cities increasing. So the farmers need intensive training how to develop their production and productivity in line with facilitating marketing and value addition knowledge also important.

When there is value addition on the product, it enhances the choice of appropriate market outlets for the producer. Hence, attention should be given to value addition of enset products and increasing the quantity of kocho and bulla products. The problem of transportation facility and distance from the nearest market are other important factor that influence the choice of suitable market channels and the profit from it. Moreover, Enset is a staple food for the study area and tremendous benefit is received from it. Hence, Concern government bodies, NGO's and other related institutions can participate on providing modern technologies that help the producer to increase their product and productivity. Government has to build more rural road infrastructure, Extension service and develop modern production materials that have a significant role in increasing production and the choices of pertinent market channel on the study area.

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Appendices

Appendices One: Household survey

QUESTIONNAIRE

This questionnaire is designed to collect data for academic purpose only. This is to enable the researcher, at Addis Ababa University, Collage of Developmental Studies, the Department of Rural Livelihood and Development. The purpose of the questionnaire is to collect data on a research topic entitled; **Enset Value Chain and its determinants: The Case of Rural Households in Abeshge Woreda, Gurage Zone**.

Your response to the questions will be kept confidential. The reliability of your response will help the quality of the research and hence be honest in giving the responses. I would like to express my deepest gratitude for your willingness to spare your precious time to fill this questionnaire.

Instruction

- You don't need to write your name.
- Kindly put (X) mark on your choice.
- Your answer/opinion has great significance for the analysis of this study!

SECTION 1:

1. General Information

1.1 Name of the Kebele_____

Name of the Household/respondent _____

1.2) Sex; 1=Male/ወንድ/ ---------- 2=Female ----------

1.3) Marital status: 1=single 2= Married 3= Divorced 4= widowed/(widower)

1.4) Educational Status: 1. Illiterate 2. Religious school 3.Non-formal Education 4. Grade 1-8 5. > grade 8

1.5) Religion: 1=Orthodox 2=Protestant 3=Catholic 4=Muslim 5=Others (specify)__

1.6) Family size _____

1.7) Number of members <15 years _____

Number of members <64 years _____

Number of members >64 years _____

1.9) Distance from main road (walking minutes) _____

2) Distance from agricultural development center (walking minutes) _____

2.1) Do you have livestock?_____

No.	Type	Qty.	Current estimated value
1.	Oxen		
2.	Cows/Heifers		
3.	Goat		
4.	Sheep		
5.	Donkey		
Total livestock asset..			

2. Production Service

1) How many Enset do you process per day? _____
2) How many women/girls are involved on the production process of Enset in a HHs? _____

3) List the activities that are primarily done by a man in the process of production at a HHs level?/

_____

_____

4) How do you rate your experience of working with your nebours in production of Enset?
a) Very high b) high c) Never at all d) very low

5) Do you expect more production from Enset in this year (2018/19
a) Yes b) No

6) Rank the activities caring out in Enset value chain based on time schedule?

No.	Type of activities	Rank
1.	Enset seedlings	
2.	Protection of growth	
3.	Planting	
4.	Hoeing & wedding	
5.	Preparation of place for production process	
6.	Harvesting & Post harvesting	
7.	Transportation and Marketing	

Table 1: Draft- The activities of Enset plantation starting from preparing seedlings to production process and Marketing

No.	Activities/ Processes	No. of Male Participant	No. of days in total	No. of Female Participant	No. of working in total	Ave. daily payment for Male Labor	Ave. daily payment for Female Labor	% of cont. by male hıoo%	% of cont. by women ıoo%	Remark
1.	Propagate/ enset seedlings and preparing protection from animals.									
2.	Planting enset									
3.	Hoeing and weeding (duping animal dug and west materials as fertilizer)									
4.	Preparing the place for production process(Clearing the land, materials will be used etc.									
5.	Harvesting and Post- harvest processing									
6.	Production Processing, storage and making ready for consumption									
7.	Transporting and marketing activities									
8.										

Extension contact

1) Did you have any extension agent contact in relation to enset production in the 2018/19 post-harvesting season? 1.Yes ( ) 2. No ( )

2) If your answer for Q. 1 is No, why?
1. No service provider nearby ( ) 2. Possessed the required information ( ) 3.Availability of contact farmers ( ) 4. Do not have time to get the service ( ) 5. Others _____

3) If Yes, how often the extension agent contacted you? _____

4) How do you feel support from Kebele DA's to increase your production of Enset, in term of:
   a) Production materials _____
   b) Finance _____
   c) Technical advice _____
   d) Technology _____

5) What is the extension advice specifically on Enset production? 1. Seed bed preparation ()
2. Fertilizer (compost) applications ( ) 3. Harvesting ( ) 4.Transplanting ( ) 5. Marketing of Enset ( ) 6. Post-harvest handling ( ) 7.Other (Specify)_____

6) Who provides the advisory service? 1. Development agents ( ) 2.NGOs (Specify) _____
3. Kebele RIAD experts ( ) 4. Research centers 5.Neighbors/friends ( ) 6. Others (Specify) _____

Marketing aspect

1) How many times on average do you supply Enset products per year? _____
2) How much and to whom did you sell your enset production?

Production type	Amount sold (kg) per each supply	To whom	Rank 1.Wholesalers ____ 2. Retailers (rural)___ 3. Consumers _____ 4. Collectors _____ 5. Brokers _____ 6. Others (Specify___	where (Place of sale)	Rank 1. local market, 2. Woreda market, 3.Zonal (Major) market, 4. Addis Ababa, 5. Other (Specify)
Kocho					
Bulla					

3) To whom do you sell primarily your Kocho and Bulla in 2018/19?
   1. Wholesalers ( ) 2. Retailers ( ) 3.Consumers ( ) 4. Local Collectors ( )

4) In deciding to whom to sell, what factors do you consider?
   1. Transport availability ( ) 2. Price ( ) 3. Fairness of scaling (Weighing) ( ) 4. Closeness in distances ( ) 5. Others (Specify)_____

5) How comfortable with the buyers of your Kocho and Bulla product?
   a) Very comfortable b) comfortable c) Uncomfortable d) very uncomfortable

6) If your answer is comfortable, what is your response? _____

7) If your answer is not comfortable, what is your response _____

8) To which one of the following marketing center do you have access? (✓)

a) Local Market b) Welkite c) Weliso d) Addis Ababa e) if other _____

9) Who sets the market price primarily for you from the following?
1. Rural Collectors 2.Consumers ( ) 3. Wholesalers ( ) 4. Retailers ( ) 5. Processors ( ) 6. Brokers ( ) 7 Others (Specify)_____

10) Means of transportation used: 1.Vehicles ( ) 2. Manpower 3. [ ] Back of animals 4. [ ] Cart 5. Others (Specify)_____

11) If you used vehicles, how accessible is it?

A) High accessible b) moderately accessible c) Least accessible d) Not accessible

12) Average selling price of kocho in harvesting season_____Birr/kg,

13) Average selling price of bulla in harvesting season _____Birr/kg,

14) How is the trend of price per unit of sales of kocho during the last 5 years? (√)?

Product type	Increasing	Decreasing	The same
Kocho			
Bulla			

15) If increasing, why? _____

16) If decreasing, why? ? _____

17) Do your kocho & bulla products have preferred qualities by buyers? (√)
1.Yes ( ) 2. No ( )

18) If your answer for Q.16 is No, what interventions are needed to improve quantity of kocho & bulla production to attract better prices___

19) Do you consider quality requirement of your customers in your production process? 1. ( ) Yes 2.No ( )

20) If your answer for Q.19 is Yes, what quality requirement do you consider for?
1. Kocho_____
2. Bulla_____

21) What was your source of information about quality requirement of your customers?

22) Do you have made any value addition on your kocho? A) Yes B) No

23) Do you have made any value addition on your Bulla? A) Yes B) No

24) If your answer for Q.22 & 23 is Yes, what are those value adding activities?

Crop type	Value adding activates*		How much it costs? (Birr/qt)
Kocho		1. Cleaning 2. Cutting 3. Storage 4. Others (Specify)	
Bulla			

25) How do you perceive your information about the market?
   a) Much b) fairness c) Less d) None

26) What type of information did you get? a) Price information ( ) b) Market place information ( )
   C) Buyers' information ( ) D) Other (Specify)_____

27) At what time interval do you get the information?1. Daily ( ) 2.Weekly 3. Monthly ( ) 4. Other (Specify) _____

28) Was the information you get is valuable? (√) 1.yes ( ) 2. No ( )

29) Did you face difficulty in finding buyers when you wanted to sell kocho & bulla?
   1. yes ( ) 2. No ( )

30) If your answer for Q. 29 is Yes, due to: 1. Inaccessibility of market ( ) 2. Lack of market information ( ) 3. Low price offered ( ) 4.Other (Specify)_____

31) What are the marketing constraints of kocho? (Rank horizontally)
   a) _____
   b) _____
   c) _____

32) What are the marketing constraints of (bulla)?
   a)_____
   b) _____
   c) _____

33) Did you sell Enset before production? Yes ( ) No ( )

34) If your answer for Q.33 is No, why you did not sell? _____

35) How many Enset Product do you produce? Amount of production during 2017/18?

Product type	Quantity produced (Kg)	Quantity Consumed (Kg)	For Seed	Quantity Sold (Kg)	Average selling price (Birr/Kg)
Kocho					
Bulla					
Others (Specify)					

III. Resource ownership and tenure

1) Is your family labor adequate for kocho & bulla production activities? 1.Yes ( ) 2. No( )
2) Total amount of hired labor for the production year 2018/19 _____
3) How much land do you own and/or rent in 2018/19? _____

Description	Size(Area) Timad or hectar	Value (Birr/timad or ha)
Owned Land		
Rent Land		
Shared Land		
Irrigable Area		
Crop Land		
Land suitable for vegetable		
Total Land holding		

(Note: 1 ha = 4 timad or 1 timad = 0.25 ha) ?

4) Do you have your own transportation facilities? 1. Yes ( ) 2. No ( )
5) If your answer for Q. 4 is yes, what type? 1. Vehicle ( ) 2. Animals transport ( )
By your own ( )

Open Ended Questions:

At the Household Head;

1. Do you help your wife/ daughter after coming back from production process of Enset and Bulla
_____
_____
_____

2. What is your livelihood or income generated from?
_____
_____
_____

3. Did the Kebele administration visited your wife to help/teach the modern way of enset production?

_____
_____
_____

4. Did you attend any kinds of training to increase your livelihood strategy and production of kocho and bulla and marketing?
_____
_____

5. The kebele administration officers tried on organizing women in cooperatives for mutual support and credit facilitation?

   _____
   _____
   _____

6. Any association//NGO or others may help you on value adding activities that to get more profit from the product?

   _____
   _____

7. Did any organization help to facilitate transportation and market to your product?

   _____
   _____
   _____

8. The product you may get from it will help you for consumption and getting income from it or is there any other income for your livelihood?

   _____
   _____
   _____

9. Do you get any support from your family member working outside the country?

   _____
   _____
   _____

10. Did you participate in activity in the past 12 months that is during the last one/two cropping seasons?(Food crop farming: crops that are grown primarily for HH food consumption)

    _____
    _____

11. How much input did you have in decisions on the use of income generated from activity?

    _____
    _____
    _____

12. When decisions are made regarding the following aspects of household life, who is it that normally takes the decision? (taking crops to the market or not?)

    _____
    _____
    _____

13. To what extent do you feel you can make your own marketing of your product?

_____

_____

14. Who is more participated on plantation of enset? _____

15. Who is following the growth and development of enset in the farm?

_____

16. Did anyone can give an advice for the growth of enset in your farm land?

_____

Thank you very much for responding to the questions.

Appendices Two

Checklist Guideline for Focus Group Discussion

1. What are the input supplier channels available? List
2. Which channels are always available and easy to you?

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3. What do you think can be done to access market outlets?

   _____

4. What pre-conditions would need to be in place before you would do business with each other?
5. Who decide how much products to sell to the market or for others?
6. What difference do you observe selling to cooperatives, traders, petty traders, wholesalers and for other?
7. How are the price established?
8. How often the price changed?
9. Is there shortage of Kocho & Bulla from the land? And when is this shortage greatest? Why?
10. What are the typical distances to Kocho & Bulla traders and consumer along each supply channels?
11. What is the payment mechanism at each level?
12. What sources of credit are available to you to enable you to buy materials for selling to be upgrading the value of Kocho & Bulla at different stages?
13. Is the term of credit is suitable for you? What is your recommendation?
14. What advantages or disadvantages you get from each other?
15. What is the mode of transport used for kocho and bulla product?
16. What are the main constraints to kocho & bulla sales?
17. What buying and selling arrangements do you see as being able to be performed by different group?
18. Who are the primary actors in your kocho & bulla value chain?
19. What is your relationship with each of the actors?
20. What are the factors affecting the working relationship between these actors?

Appendices Three

Checklist for Key Informants Interview

1. Name of the organization: _____

2. Role of the interviewee in the organization:

3. Location and contact information: Region_____/Zone_____/Woreda_____/ Kebele_____/ P.O. Box_____/telephone _____

4. Type of the organization: public/private/NGO/CBO.

5. Organizational mission, vision and objectives.

6. What is the role of your organization in Enset value chain in the study area?

7. What are the challenges and opportunities you faced in undertaking those roles assigned to your Organization?

Strength	***Weakness***	***Opportunities***	***Threat***

8. Linkage /interaction/ partnership/ coordination between actors?

Thank you very much for responding to the questions.

Appendices Four

Checklist for Traders

Topic	Sub-Topics	Questions / Comments
Personal Information	Name Physical Address, Tel	For established firms try to get a business card, or mobile phone No. for purposes of future reference
Type of traders		1= Wholesaler 2 = Retailer 3 = Both wholesaler and retailer
Sources of Kocho & Bulla		• Who are your major suppliers • Average proportion of supply by supplier
Demand	Quantity Type of buyer Seasonality Variety Consumer Preferences Price data	• Average Quantity sold normally per day • To whom do you sell? • Are there changes in volume of sale over time? • If so what is their respective demand / preference • What is the price variation as per species differences • Are there changes in prices over time? (give reasons?) • Do you find problems selling your products? (Which?)
Supply	-Source by area -Source by type of person -Price -Quality	▪ Which are your supply areas (geographically) ▪ From whom do you buy? ▪ From where do you buy? (Meeting pt.) ▪ At what price do you buy the species? ▪ Does the price change over time? If so why? & How? Which months is it highest and lowest? ▪ Do you have problems getting products? If so which are they?
Quality	-Post harvest issues	▪ What are the quality requirements of products along the chain?

Market Information	-Sources -Spatial arbitrage	▪ Do you get market info? (e.g. on prices?) ▪ If so from whom and how? ▪ Is there a relationship between prices in different areas at a given time
Price Formation	Market power	▪ Who determines the price? ▪ How is the price determined? ▪ If firm / individual is a price taker, find out why?
Institutional & legal framework	Associations	▪ Do you belong to an association? ▪ Are there any market regulations? If so which are they and how do they affect your business?

Appendices Five

Consumers Interview Schedule

I. General Information

1. Name of Respondent: _____
2. Zone: _____ Woreda: _____ Kebele: _____ Village: _____
3. Age of the respondent: [___] years
4. Sex of the respondent (√): 1. [ ] Male 2. [ ] Female
5. Education level of the respondent (√): 1. [ ] No formal education 2. [ ] 6th grade or less
3. [ ] 7th to 12th grade 4. [ ] Certificate 5.[ ] Diploma 6. [ ] Degree
6. Marital status (√): 1. [ ] Married2. [ ] Single 3. [ ] Divorce 4. [ ] Widowed
7. Religion
   1. Protestant [ ] 2. Orthodox [ ] 3. Muslim [ ] 4.Wakefata [ ]5. Others/specify_____
8. Distance to nearest town: [_____]OR [_____] hrs walk
9. What is your major means of income generation?
1. [ ] Farming 2. [ ] Trade 3. [ ] Employment 4. [ ] Others _____
10. How much do you earn per year (estimate based on weekly, monthly income):_____Birr
11. Is Kocho & Bulla consumed in your family? 1. [ ] Yes 2. [ ] No
12. If no consumption of Kocho and Bulla product, why?

_____

13. Experience in Kocho & Bulla products consumption? _____ Years
14. Do you produce and consume or purchase? 1. [ ] Purchase2. [ ] Produce
15. If you purchase, what is the proportion of your income used for purchase of Kocho & Bulla product?

II. Demand for the Kocho products

1. What type kocho and bulla products purchased for consumption? Please respond to the following questions. (*Multiple response is possible)

Kocho and Bulla type	Quantity purchased (per market day)	No. of market day per weak	Low price paid (birr/ kg)	No. of months you may buy at lower price	High price paid (birr/kg)	No. of months you may buy at higher price	*From whom do you buy
Kocho							
Bulla							

2. Do you consider any quality requirements to purchase Kocho and Bulla? 1. [ ] Yes 2. [ ] No
3. If yes, what quality requirement do you consider for?
4. Where do you purchase the Kocho and Bulla from?
5. How much did you pay for it by species and product?
6. Which species and product is preferred by your household and why?

_____. Why?_____
7. What are the constraints hindering consumption of Kocho and Bulla ? Rank horizontally

(1= most severe, 2= second severe and etc)

Type of fKocho and Bulla	Supply Shortage	Income shortage	Lack of storage at home	High price of product	Poor product handling	Lack of market information	Others (specify)

8. Do you know the benefits of consuming Kocho and Bulla product? 1. [ ] Yes2. [ ] No
9. Do you think there is problem with consumption of Kocho and Bulla product? 1. [ ] Yes2. [ ] No
10. If there ,what is the problem ?

11. Do you prefer packed product? 1. [ ] Packed . [ ] Fresh

12. What should be done to increase Kocho and Bulla product product consumption?

13. Do you get Kocho and Bulla product always? Yes [ ] No [ ]

14. If No to question

13. Why?_____

15. In your opinion, what type of Kocho and Bulla has got the highest demand and why?

16. Which months of the year is the Kocho and Bulla you prefer scarce or expensive? (Mention the fish Type and product)

17. Give suggestions on how best the above problems affecting supply, your access to fish,

Or Affordability of fish can be solved?

THANK YOU FOR YOUR RESPONSE!

Appendices Table Six: The result of and multicollinearity**vif**test

Contingency coefficient for multiple linear regression

	QEnSld	Age	EduLevel	FamlSize	NoOfWom	EnsPro~y	AcsblTrn	MrktCent	HMEPr	HMBPr
QEnSld	1.0000									
Age	-0.0449	1.0000								
EduLevel	-0.0346	-0.1611	1.0000							
FamlSize	0.1539	-0.0154	0.0198	1.0000						
NoOfWom	0.2989	0.0640	-0.0329	0.6826	1.0000					
EnsProdInDay	-0.0093	-0.1248	-0.0482	0.0422	0.0449	1.0000				
AcsblTrn	0.0818	-0.0141	-0.0018	-0.1781	-0.0961	0.0063	1.0000			
MrktCent	0.0900	0.1566	-0.0073	-0.0816	0.0743	0.1022	0.1202	1.0000		
HMEPr	0.5585	0.1333	-0.1042	0.4281	0.5427	-0.1290	-0.1070	0.0849	1.0000	
HMBPr	0.4136	0.0358	-0.1017	0.2398	0.3744	-0.0756	0.1065	-0.0373	0.5286	1.0000
HMLO	0.2493	-0.0001	-0.0182	0.4285	0.5816	0.0101	-0.0291	0.0098	0.5277	0.5006
ExtContServ	-0.1234	0.0829	-0.0633	0.0075	-0.0367	-0.0184	-0.1356	-0.0241	-0.0427	-0.1228
RateOfExp	0.1667	-0.1266	0.1282	-0.1384	-0.1371	-0.0021	0.1543	-0.0702	-0.0909	0.0138

	HMLO	Ex~tServ	RateOf~p
HMLO	1.0000		
ExtContServ	-0.0627	1.0000	
RateOfExp	-0.1622	-0.0729	1.0000

Source: Own computation from survey result, 2019

Appendices Table Seven*:* Variable included in MVP model

Variable	VIF	1/VIF
NoOfWom	2.54	0.393713
FamlSize	2.03	0.492014
HMEPr	1.96	0.511446
HMLO	1.88	0.530912
HMBPr	1.66	0.603194
AcsblTrn	1.13	0.884986
MrktCent	1.13	0.887684
Age	1.11	0.898800
RateOfExp	1.11	0.902240
EnsProdInDay	1.08	0.924174
EduLevel	1.08	0.929774
ExtContServ	1.05	0.955008
Mean VIF	1.48	

Appendices Table Eight*:* Conversion factor used to compute tropical livestock unit (TLU)

Livestock Category	Conversion factor
Calf	0.25
Oxen / Cow	1.00
Bull	0.75
Heifer	0.75
Horse /mules	1.10
Donkey adult	0.70
Donkey young	0.35
Goats /sheep adult	0.13
Goat /Sheep young	0.06
Poultry birds	0.013
Weaned calf	0.34

Source: Alem S. (2007) (as cited in Rehima 2006).