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MARKET CHAIN ANALYSIS OF TEFF: THE CASE OF ADOLA REDE WOREDA, GUJI ZONE, OROMIA NATIONAL REGIONAL STATE, ETHIOPIA

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MARKET CHAIN ANALYSIS OF TEFF: THE CASE OF ADOLA REDE WOREDA, GUJI ZONE, OROMIA NATIONAL REGIONAL STATE, ETHIOPIA

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DEDICATION

To my father Bululta Godana and my mother Dimatu Basaye, who are unlucky to share with me the success I have been achieving in academic endeavors. “May their soul rest in peace!”

STATEMENT OF THE AUTHOR

First, I declare that this thesis is my own work and that all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment of the requirements for M.Sc. degree at Dilla University and is deposited at the University Library to be available to borrowers under rules of the library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

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BIOGRAPHICAL SKETCH

The author was born on September 03, 1993 G.C in East Guji zone in Adola Rede Woreda at Abalo Village from Mr. Bululta Godana and Mrs. Dimatu Basaye. He attended his elementary education in Abalo Elementary School, secondary education in Bilu Secondary School and high school education at Adola Woyu High School. Then after passing entrance qualification examination successfully, he joined University of Gondar and graduated in B.Sc. degree in Agricultural Economics on July 4, 2015 G.C. He served in Bule Hora University as graduate Assistant at Plant Science Department of Agricultural Sciences College until he joined the Post Graduate studies of Dilla University in 2018 for pursuing his MSc. degree in Agricultural Economics.

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ABBREVIATION AND ACRONYMS

ARDAO	Adola Rede Woreda Agricultural Office
BLUE	Best Linear Unbiased Estimator
BP	Breusch Pagan
CC	Contingency Coefficient
CRr	Constriction Ratio
CSA	Central Statistical Agency
DAP	Diammonium Phosphate
DAs	Developmental Agents
FAO	Food and Agriculture Organization
FTC	Farmers Training Center
GDP	Gross Domestic Product
GMM	Gross Market Margin
GTP	Growth and Transformation Plan
KB	Koenker Bassett
KG	Kilo Gram
NMM	Net Market Margin
ONRS	Oromia National Regional State
OLS	Ordinary Least Square
S-C-P	Structure-Conduct-Performance
VIF	Variance Inflation Factor

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MARKET CHAIN ANALYSIS OF TEFF: THE CASE OF ADOLA REDE WOREDA, GUJI ZONE, OROMIA REGIONAL STATE, ETHIOPIA

Abstract

Teff is indigenous to Ethiopia and it is an important crop, for farm income as well as food security to its people which is grown primarily as a cash crop. The study attempted to analyze the market chain of Teff in Adola Rede Woreda with the specific objectives of identifying the major constraints and opportunities in Teff production and supply to market, analyzing the structure-conduct-performance of Teff marketing, and identifying major factors affecting smallholders' Teff market supply in the study area. Both primary and secondary data were used. The primary data were generated by unstructured questionnaire, key informant interviews and personal observation. Accordingly, the primary data were collected from 121 Teff producers. Multi stages sampling technique was applied to select sample frames. Two types of analysis, namely descriptive and econometric analysis were used for analyzing the data collected from farmers and traders in the study area. Multiple linear regression models were employed to estimate factors affecting supply of Teff. Twelve explanatory variables were hypothesized to affect the household level marketed supply of Teff. Among these hypothesized variables that used determine the supply of Teff, econometric result showed that five variables such as Number of oxen owned by farm households, frequency of extension contact, Education level, Improved Seed and Distance nearest to the market were significantly affected the volume of Teff supplied to the market. The results of the study indicated that, Quantity of Teff passed through different marketing agents from farmers to consumers. The Farmers-Collectors-Retailers-Wholesalers-Processors-Consumers channel carried the largest volume, which is 59.58% of the total volume followed by Farmers-Wholesalers-Processors-Consumers channel which carried about 22.06% of the total Teff marketed. Structure of Teff market indicates four-firm Concentration Ratio (CR4), that is, the share of the largest four traders in the total volume of Teff purchased. The four largest traders handled 33.03% of the total volume of purchased Teff. This suggested that the Teff market in Adola Rede Woreda shows a weak oligopolistic market. The major barriers to enter into the market were shortage of capital, and information assymetry. Strengthening the existing moreover, extension system through training in a way to serve grassroots level producers in all aspect is important.

Keywords: ***Teff, Multiple regression model, Market Chain, S-C-P***

1. INTRODUCTION

1.1. Background of the Study

According to the famous Russian botanist, agronomist, plant geneticist and plant breeder Nikolai IvanovichVavilov's (1992), conclusion, Ethiopia is the center of origin of *Teff (Eragrostis tef)* after an expedition to Egypt and Somalia in 1927. This was later confirmed by the renowned US plant geneticist Jack Harlan who called *Teff* "the noble cereal of Ethiopia" *(*Andersen and Winge, 2012).

Teff is indigenous to Ethiopia and it is an important crop, for farm income as well as food security to its people which is grown primarily as a cash crop. On the consumption side, Teff makes up as much as 12 percent of all food expenditures and is therefore for consumers the leading food crop in their consumption basket (FAO 2012).

Compared with other cereals, Teff is hardy and able to withstand adverse weather conditions and is therefore considered a lower risk crop (Fufa et al. 2011). Teff is mostly grown at middle elevations between 1,800 and 2,200 meters above sea level and in regions where there is adequate rainfall. These characteristics, together with it being easy to store, seemingly explain the sustained importance of Teff in the country. Its grain is mainly used for making injera, a spongy flat bread, Ethiopia's (and Eritrea's) main national dish.

Teff is Ethiopia's most valuable staple crop which is cultivated over approximately 3.02million hectares, accounts for 24 percent of land area under cereal cultivation, and the largest share of all staple grains in Ethiopia. In 2017, Teff accounts for 3,017,914 (24percent) of the grain area, followed by maize 2,135,371 (17percent), sorghum 1,881,970 (15percent) and 3.675ton/ha and 2.525ton/ha, 1.664 ton/ha yield respectively. And it is the second most important cash crop, generating 464$ million per year for farmers (Hyejin 2018).

Amhara and Oromia are the two major regions, and collectively, the two regions account for 85.5percent of the Teff area and 87.8 percent of the Teff production. Due to the high price, the urban affluent consumers consume relatively more Teff than the rural poor. Nevertheless, Teff has shortcomings to become an income-generating global commodity for Ethiopian producers.

Some of the shortcomings are low yields compared to other major cereals, high labor-input requirement, lack of infrastructure, and limited or inefficient market (Hyejin 2018).

The study area is found in East Guji Zone, Oromia Regional State (ORS). Teff is the main cash crop and an income source of smallholder farmers in the study area. However, the Woreda's Teff market chains have not been studied yet. In order to solve basic crops marketing problems and to analyze its role towards improving the livelihood and income level of farmers, the role of marketing investigation is indispensable. Therefore, it is necessary to study the market chain from production to end consumers to identify gaps. Thus, the current study focused on the structure, conduct and performance of Teff market, and factors affecting the supply of Teff to the market in case of this Woreda.

1.2. Statement of the problems

The agricultural sector in Ethiopia still continues to face a set of constraints that restrict further accelerated growth. Some of these constraints can be underdeveloped markets at federal and regional levels, public and private sector partners‟ lack of capacities to implement. The efforts of increasing agricultural production and productivity have to be accompanied by a well-performing marketing system which satisfies consumer demands with the minimum margin between producers and consumers prices. That is, higher prices for producers can encourage farmers to adopt new technologies and increase production (Wolday, 1994).

Improved information and marketing facility enables farmers to plan their production more in line with market demand, to schedule their harvest at the most profitable time, to decide which market to sell their produce to and negotiate on a more even footing with traders and it also enables traders to move their produce profitably from a surplus to deficit market and to make decisions about the economics of storage, where technically possible. Thus the market information is critical to the law of one price and to the price discovery process (Khol and Uhl, 2002).

Provision of improved and high yielding varieties, chemical fertilizer, pesticides and insecticides may favour the farmer in increasing production; however, this is not an end by itself. Therefore, Khuls and Uhl (2002) without modern marketing system, including communications, transportation, storage facilities and financial arrangement this is not possible.

In addition to the above researcher, (Jema 2008) the Ethiopian agricultural output markets are characterized by inadequate transport network, limited number of traders, inadequate capital facilities, high handling costs, inadequate market Information system, weak bargaining power of farmers and underdeveloped industrial sectors. Farmers in Ethiopia are more focused on the production part without having adequate market information about their products.

One of the fascinating features of agricultural marketing systems in market economies is that, their structure is determined or influenced by a wide range of factors. These include economic, demographic, social, legal and climatic factors as well as the characteristics of the raw materials and consumer products. Effective marketing systems are shaped by these influences and were tending to change as these underlying influences change. Thus they are often well adjusted to the environment in which they operate. Sometimes, however, it is possible to intervene in the marketing process in ways that improve the functioning of the system or accelerate changes that are already underway (Lawrence, 2003).

Thus, if market performance is inefficient, the sustainability of the production become questionable and, as a result, a steady supply of a commodity for the market may become difficult. The crucial role of market oriented agriculture and, hence, an efficient agricultural marketing system, is also apparent from the pivotal role that agricultural growth must play in driving overall economic growth of Ethiopia (Jema 2008).

Market chain analysis is useful study because it helps to determine whether the market system through which households sell their surplus products or services, and it helps to construct framework at the point when we wish to understand marketing constraints and opportunities for households either for items sold or items they need to purchase (Spilsbury *et al*., 2004).

Teff is a major crop produced by the majority of farmers in Adola Rede Woreda. This Woreda also have 85 percent of land cultivated for Teff production that characterized by high potential in production of this crop. Its income generating capacity is low as compared to its production potential, which discourages farmers to produce more for the market, due to factors such as; long distance to the market, lack of access to market, use of traditional marketing system, lack of properly functioning marketing system which often resulted in lower producers‟ price," inefficient market chain, lack of market information through mass media (radio, television,), lack

of infrastructure (transportation, storage facilities), lack of linkages with traders, broker interference and the others. As a result, these problems needs more work in market chain approach to fully understand and resolve the problem of Teff market in the study area.

Even though some related studies on Teff marketing such as (Tadele, Mulu and Paul, 2016), (Wolday 1994), (Yadeta and Temesgen 2016), (Muhammed 2011), (Azebe and Tadele 2017) and (Girma 2015) were carried out elsewhere in Ethiopia, to the best of my knowledge, such study that provides relevant information for improving the marketing of Teff in the study area had not been undertaken. Therefore, the critical clues here would be, how these unorganized traditional marketing system be changed to modernized and organized market and would enable to increase the incentive of the producers to produce efficiently and thereby increase their income by selling their product in appropriate market with better return rather than locally or traditionally. Not only this but also this study have the purpose of investigating Teff marketing chains, identifying market chain actors and their roles, factors affecting Teff supply to the farm level and assessing the marketing performance of Teff markets which will narrow the information gap on the subject, choose the best channel to increase their income and will contribute to better understand on improved strategies for reorienting marketing system for the benefit of smallholder farmers and traders. Thus, this study attempted to fill this gap by conducting market chain analysis which generate appropriate information, which will benefit all the stakeholders (smallholder farmers, traders, and other market participants) involved in production and marketing of the product.

1.3. Research questions

The study is attempted to answer the following basic questions;

1. What are the existing Teff market structure, conduct and performance of the study area look like?
2. What are the key factors affecting smallholders' market supply of Teff in the study area?
3. What are the major constraints and opportunities in Teff productions and supply to market in the study area?

1.4. Objectives of the study

The General objective of this study is to assess the market chain analysis of Teff production in Adola Rede Woreda.

The specific objectives are;

1. To analyze the structure conduct and performance of Teff market in the study area.
2. To identify major factors affecting smallholders' Teff market supply in the study area.
3. To identify the major constraints and opportunities in Teff production and supply to market in the study area

1.5. Scope and Limitation of the study

The scope of the study was to describe Market Chain Analysis of Teff in the Adola Rede Woreda. The investigation covered only one Woreda, three of the twenty eight rural kebeles of the Woreda (Gunacho, Bilu, and Orone) and one crop from the available cereal crops of the Woreda. The researcher faced some challenges while doing this research. To begin with, some respondents were not given values to the questionnaire and some others were not returned it totally. So, the researcher take some measurement like giving orientation, to overcome these problems.

1.6. Significance of the Study

The study gave detailed information on how Teff marketing chain is currently functioning in Adola Rede Woreda. The result of this study would enable to know the marketing channels and structure, conduct and performance of Teff market chain in the study area. Moreover, this study would provide information on factors affecting Teff supply to the market that helps the policy makers, particularly the farmers. Generally, the study would have the following significance; it would be an input to the researchers who want further investigation on Teff marketing, a good stepping-ground for other studies related with marketing agricultural commodities, benefit researchers and governmental and non-governmental organizations for policy formulation; planning and development of agricultural marketing and cooperatives in the country, and shows, the policy makers and market participants on which variables to focus to increase Teff supply to the market. Since more is not written in this area, it would also an add to the existing literature or also serves as a reference document for researchers to embark on studies of the same or related kinds in other parts of the country.

1.7. Organization of the Thesis

This thesis contains five main chapters. The first chapter deals with the background, statements of the problems, research questions, objectives, significance, scope and limitations of the study. The second chapter deals with review of literature where the basic marketing concepts and relevant empirical studies were discussed. The third chapter of the thesis deals with a brief description of the study area and methodology of the research (data collection and analysis method) and the fourth chapter deals with results and discussion. Finally, chapter five presents conclusions and recommendations.

2. LITERATURE REVIEW

This chapter presents the review of the Theoretical and Empirical literature of the study at hand.

2.1. Definitions and Concepts

2.1.1. Market

Different literatures define market in different ways but having almost similar meaning for the reader. According to Larson (1957), the term market mean the place where buying and selling takes place, an area in which a good is sold, a group of people carrying on buying or selling, or the commodity traded. Market is an area in which one or more sellers of a given products and their close substitutes exchange with and compete for the patronage of a group of buyers (Mendoza, 1995).

According to Kilingo and Kariuki (2001) market is defined as an institution within which the forces of demand and supply operate; sellers, and consumers are in constant communication, and there is change of title to goods and /or services. Market is the set of the actual and potential buyers of a product (Kotler and Armstong, 2003). A market is a point, or a place or sphere within which price-making force operates and in which exchanges of title tend to be accompanied by the actual movement of the goods affected *(*Barakade *et al., 2011).*

2.1.2. Marketing

The term marketing has a variety of meanings. Marketing is the performance of all business activities involved in the flow of goods and services from the point of initial production until they are in the hands of ultimate Consumer (Mendoza, 1995). Marketing in its simplest form is defined as the process of satisfying human needs by bringing products to people in the proper form, time and place (*Branson and Norvel, 1983).* Marketing is productive because it adds form, time and place utility (or satisfaction).

2.1.3. Agricultural marketing

Agricultural marketing refers to all marketing functions performed to move agricultural inputs and outputs from the point of production to the point of their final utilization. The agricultural

marketing system is a link between the farm and the non – farm sectors. Marketing can be described as the performance of all business activities involved in the flow of food products and services from the point of initial agricultural production until they are in the hands of consumers (Kohls and Uhl, 1985; Bain and Howells, 1988).

2.1.4. Marketing system

The concept of marketing system includes both physical distribution of economic input and products and the mechanism of process or coordinating production and distribution (cited in Andargachew 1990). Branson and Norvel (1983) defined the marketing system in terms of what is otherwise known as marketing channel. In broad terms, marketing system may be defined as the totality of product channels, market participants and business activities involved in the physical and economic transfer of goods and services from producers to consumers. Marketing system operates through a set of intermediaries performing useful commercial functions in chain formations all the way from the producer to the final consumers (Islam *et al.*, 2001).

2.1.5. Marketing channel

Formally, 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 (Koler*et al.*, 2003). This channel may be short or long depending on kind and quality of the product marketed, available marketing services, and prevailing social and physical environment (Islam *et al*., 2001). Marketing channels by timely providing the proper amount of goods and services in the proper place, of right quality and optimal price, not only meet the needs of consumers, but also stimulate the demand, by using different methods of promotion among all organizations in the marketing channel. Channel also may be direct or indirect; direct channels, producers or manufacturers sell their goods directly to individual consumers, while indirect channels include a trading company as well (Islam et al., 2001).

2.1.6. Market chain analysis

Market chain is the term used to describe the various links that connect all the actors and transactions involved in the movement of agricultural goods from the producer to the consumer (CIAT, 2004). Commodity chain is the chain that connects smallholder farmers to technologies

that they need on one side of the chain and to the product markets of the commodity on the other side (Mazula, 2006). Market chain analysis, therefore, identifies and describes all points in the chain (producers, traders, transporters, processors, consumers), prices in and out at each point, functions performed at each point/ who does what?, market demand/ rising, constant, declining, approximate total demand in the channel, market constraints and opportunities for the products.

A marketing chain is used to describe the numerous links that connect all actors and transactions involved in the movement of agricultural products from the farm to the consumer (Lunndy *et al.*, 2004). It is the path one good follow from their source of original production to ultimate destination for final use. Functions conducted in a marketing chain have three things in common; they use up scarce resources, they can be performed better through specialization, and they can be shifted among channel members (FAO, 2005). According to Hobbs *et al.* (2000), the term supply chain refers to the entire vertical chain of activities: from production on the farm, through processing, distribution, and retailing to the consumer. In other words, it is the entire spectrum, from gate to plate, regardless of how it is organized or how it functions.

2.1.7. Marketed and Marketable surplus

Marketed Surplus refers to the amount actually taken to the markets irrespective of the needs for home consumption and other requirements (Wolday, 1994). Marketed surplus is defined as the proportion of output that is marketed (Harris, 1982).

Marketable surplus is the quantity of the produce left out after meeting the farmers' consumption and utilization requirements for kind payments and other obligations such as gifts, donation, charity, etc. Thus, marketable surplus shows the quantity left out for sale in the market (Thakur *et al.*, 1997), which has the same conceptual meanings with that of (Wolday, 1994) findings, penned that, the marketable surplus is the residual with the producer after meeting the requirement of seed, payment in kind, and consumption by farmer.

Marketed surplus may be equal to marketable surplus, but may be less if the entire marketable surplus is not sold out and the farmers retain some stock and if losses are incurred at the farm or during the transit (Thakur *et al.*, 1997). In the case of crops that are wholly or almost wholly marketed, the output and marketed surplus will be the same (Reddy *et al.*, 1995).

The importance of marketed and marketable surplus has greatly increased owning to the recent changes in agricultural technology as well as social patterns. In order to maintain the balance between demand for and supply of food grains with the rapid increases in demand due to higher growth population, urbanization, industrialization and overall economic development accurate knowledge on marketed and marketable surplus is essential in the process of proper planning for the procurement, distribution, export and import of agricultural product (Malik *et al.,* 1993).

2.1.8. Approaches to Study the Agricultural Marketing

The study of marketing involves various approaches. These include; the functional approach, the system or institutional approach and the individual or commodity approaches (Mendoza, 1995).

2.1.8.1. Functional Approach

In this approach we took all the basic marketing activities (functions) that have to be performed in the agricultural commodities and at the marketing of inputs in to agricultural production. Functional approach studies marketing in terms of the various activities that are performed in getting farm product from the producer to the consumer (Cramer et.al. 1997). Marketing of agricultural products consists primarily of moving products from production sites to points of final consumption. In this regard, the market performs widely accepted functions like: a) exchange (buying and selling), b) physical (processing, storage, and transportation), and c) facilitating (standardization, financing, risk bearing, and market information). Most of these functions are performed in the marketing of nearly all commodities (Rahima, 2006).

2.1.8.2. Institutional (System) Approaches

Institutional approach examines the activities of business organizations or people in marketing. The institutional approach to the studies on agricultural marketing problems pays attention to the nature and characteristics of the various middlemen and related agencies and organization of marketing machinery (Kohls and Uhl, 1985).

This approach focuses on the description and analysis of different organizations engaged in marketing (producers, wholesalers, agents, retailers, etc) and pays special attention to the operations and problems of each type of marketing institution. The analysis is based on the

identification of the major marketing channels and it considers the analysis of marketing costs and margins. The organizations or people involved are middlemen who perform the operations necessary to transfer goods from the producer to consumer, because of the benefit of specialization and scale that exist in marketing as well as production (Cramers and Jensen, 1982).

2.1.8.3. Commodity (Individual) Approach

In a commodity approach, a specific commodity or groups of commodities are taken and the functions and institutions involved in the marketing process are analyzed. This approach focuses on what is being done to the product after its transfer from its original production place to the consumer (Kohls and Uhl, 1985).It helps to identify the specific marketing problems of each commodity as well as improvement measures. The approach follows the commodity along the path between producer and consumer and is concerned with describing what is done and how the commodity could be handled more efficiently. For this study a combination of all methods or mainly institutional and functional approaches were used. Among the available marketing study approaches, commodity approach was employed due to its combination nature of both functional and institutional approaches. Hence, this approach is appropriate for this study

2.1.9. Framework for Evaluation of Marketing System

The development of reliable and stable market system has been an important element in commercialization and specialization in the agricultural sector. In order to study the functioning of markets many researchers have applied the Structure-Conduct-Performance (SCP) paradigm. The S-C-P approach will developed in the United States as a tool to analyze the market organization of the industrial sector and it was later applied to assess the agricultural system and this framework was to evaluate the performance of industries in the USA (Meijer, 1994). The framework distinguishes between three related levels; the structure of the market, the conduct of the market, and the performance of the market.

2.1.9.1. Market Structure

Market structure is defined as, those characteristics of the organization of the market that seem to exercise strategic influence on the nature of competition and pricing within the market (Bain,

1968). It also refers to the number of buyers and sellers, number and size distribution of firms, the degree of product differentiation, the presence or absence of barriers to entry facing new firms (Branson and Norvell, 1983). Kohls and Uhl (1985) bring into play as a rule of thumb, four largest enterprises‟ concentration ratio of 50 percent or more (an indication of a strongly oligopolistic industry), 33-50 percent (a weak oligopoly) and less than that (competitive industry).

2.1.9.2. Market Conduct

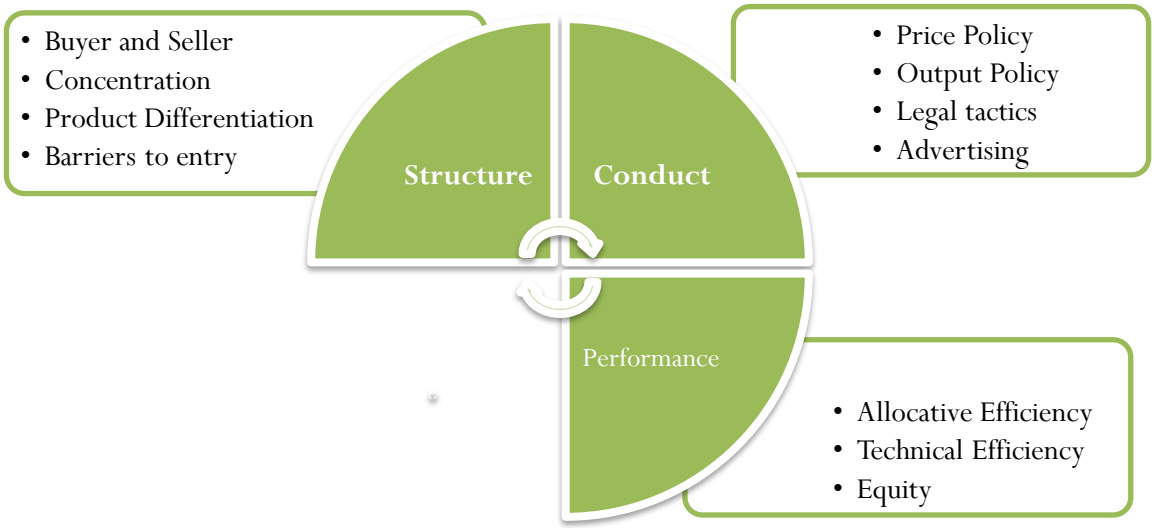
Market conduct refers to the practices or strategies of traders in maximizing their profits or it refers to the market behavior of all firms. Market conduct deals with the behavior of firms that price-searchers are expected to act differently than those in a price-taker type of industry (Cramers and Jensen, 1982). Price searchers can determine their selling prices or quantity of output they sell. In addition, they could use their market power to weaken or eliminate competitors example reducing price (Rahima, 2006).

The market behavior of firms was determine whether or not they compete and whether they are acting innovatively to improve market efficiency. Conduct is pattern of behavior which enterprises follow in adopting or adjusting to the market in which they sell or buy, in other words the strategies of the actors operating in the market (Meijer, 1994).

2.1.9.3. Market Performance

Performance of the market is reflection of the impact of structure and conduct on product price, costs and the volume and quality of output (Cramers and Jensen, 1982). If the market structure in an industry resembles monopoly rather than pure competition, then one expects poor market performance. Market performance is how successfully the firm’s aims are accomplished, which shows the assessment of how well the process of marketing is carried out (Abbott and Makeham, 1981). By analyzing the level of marketing margin and their cost components, it is possible to evaluate the impact of the structure and conduct characteristic on market performance (Bain, 1968). There are indicators, whether the market performance is successfully functioning or not. Different studies conducted on marketing identify the following key question to identify the nature of marketing performance. Is produce assembled and delivered on time and without willtage? Is it well packed and presented attractively? Is its quality reliable and are terms of

contract observed? Is the consumption of the products increasing and sales in competitive market expanding? There are such practical indicators of how well a certain marketing system is operating.



Source; Wase 2018

Figure 1. The relationship of marketing structure, conduct, and performance

All the three parameters do not have unidirectional movement but rather have an interdependent relationship as shown in f**igure** 1. Hence, market structure does not only influence market performance but also has an impact on market conduct. Furthermore, performance also affects the development of market structure and market conduct. The latter limits a similar effect the structure of the marketing system (Wase 2018).

2.1.10. Methods of Evaluating Marketing Performance

Commonly used measures of system performance are the marketing margin and marketing costs.

2.1.10.1. Marketing costs

Marketing costs: It refers to those costs which are incurred to perform various marketing activities in the transportation of goods from producer to consumers. Marketing costs includes handling cost (packing and unpacking, costs of searching for a partner with whom to exchange, screening potential trading partners to ascertain their trustworthiness, bargaining with potential trading partners (and officials) to reach an agreement, transferring the product, monitoring the

agreement to see that its conditions are fulfilled, and enforcing the exchange agreement *(*Holloway *et al.*, 2002*).*

2.1.10.2 Marketing margin

A marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. The total marketing margin is the difference between what the consumer pays and what the producer/farmer receives for his product. In other words, it is the difference between retail price and farm price (Cramers and Jensen, 1982).

A wide margin means usually high prices to consumers and low prices to producers. The total marketing margin may be subdivided into different components: all the costs of marketing services and the profit margins or net returns. The marketing margin in an imperfect market is likely to be higher than that in a competitive market because of the expected abnormal profit. But marketing margins can also be high, even in competitive market due to high real market cost *(Wolday, 1994).*

2.1.11. Teff Production and Marketing in Ethiopia

2.1.11.1. Teff production in Ethiopia

Ethiopia is the largest Teff producer in the world. In 2017, Teff accounts for 24% of the grain area, followed by Maize 17% and sorghum 15%. Amhara and Oromia are the two major regions, and collectively, the two regions account for 85.5% of the Teff area and 87.8% of the Teff production (CSA, 2017).

Table1. Teff Production in Ethiopia

Crop	Area in ha	Yield in ton / ha	
Grain crops	**12,574107 * (100%)**	-	
Maize	2,135571 (17%)	3.675	
Sorghum	1,881970 (15%)	2.525	
Teff	3,017914 (24%)	1.664	
Teff production region	**Area in ha (% total area)**	**Production in ton (% of TP)**	**Yield (ton / ha)**
Tigray	167,584 (5.5%)	2,410,116 (4.8%)	1.438
Amhara	1,137,844 (37.7%)	19,328,573(38.5%)	1.699
Oromia	1,441,030 (47.8%)	24,737,963 (49.3%)	1.717
SNNPR	246,099 (8.2%)	3,412,547 (6.8%)	1.387
Benishangul-Gumuz	24,433 (0.8%)	303,184 (0.6%)	1.241
Others	924 (0.03%)	12,014 (0.02%)	-
Total	**3,017,914 (100%)**	**50,204,400 (100%)**	

Source: Hyejin Lee (2018)

Teff is popular because it is a low risk crop. Of the 12 million smallholder farmers in Ethiopia, 6.2 million grew the crop between 2004 and 2014. It can be harvested two to five months after sowing. It is relatively resistant to many biotic and abiotic stresses. Thus, it adapts to a range of growing conditions where major crops may fail. However, the overall Teff production in Ethiopia is at a rudimentary stage. Adoption of improved Teff seeds is low, farm plots are fragmented, mechanization is almost absent, harvest loss is substantial, and public investment in research is lacking (CSA 2017).

In fact, Ethiopia initiated Teff research programs as early as late 1950s. The research programs focused on breeding Teff varieties to enhance production. With such efforts, 35% of Teff producers adopted improved Teff seeds in 2012, compared to 7% in 2002. Although increased over the decade, the limited access to and unaffordable price of the improved seeds still prevent smallholder farmers from widely adopting the seeds.

Changes in the types of cultivated Teff are observed over time. A noticeable change is the increase in white-colored Teff at the expense of red and mixed-colored Teff. The white Teff made up 69.6% of the Teff grown in 2012, compared to 48.2% in 2002. On the other hand, the

share of red Teff declined from 36% to 19.7% during the same period. The color of Teff grains, white, mixed and red, mostly decides its grade for quality and price. The white commands the highest price and red the lowest. The very-white magna, a sub-type of the white, commands even a higher premium price. The premiums for the white and magna Teff partly come from the social preference for the white color, and Slaklkneckt (1997) described the white Teff as follows: White Teff is the preferred type but only grows in the highlands of Ethiopia. It requires the most rigorous growing conditions, has the mildest flavor, and is the most expensive form of Teff. Just like white bread has been a status symbol in the United States, white Teff is usually reserved for the wealthiest and most prestigious families in Ethiopia.

In line with the description above, more of the white Teff tends to be cultivated and traded around Addis Ababa. Addis Ababa is the capital city where many of the affluent reside and the largest Teff market of the country. Besides the social preference for the white color, the popularity of the white comes from the introduction of the improved variety Quncho. Quncho meaning the top in the local language is the major achievement of the Teff breeding program in Ethiopia. The variety will derived from the combination of two traits, high yield and white seed. With its release in 2006, Quncho became the first improved variety broadly adopted by the Ethiopian farmers and contributed to 10% increase in Teff productivity.

The agronomic practices to cultivate Teff have little changed, slowing improvement in Teff productivity. One such practice is broadcasting for sowing. Broadcasting is a traditional method commonly used for Teff sowing in Ethiopia due to its small grain size (CSA 2017).

From these reviewed literatures on the Teff production in Ethiopia, lack of adapted varieties, extreme production seasonality, seasonal price fluctuations, poor pre- and post-harvest handling, lack of storage are among the cited realities.

2.1.11.2. Teff marketing in Ethiopia

Agricultural marketing plays an important role not only in stimulating production and consumption but also in accelerating the pace of economic development (Kohls and Uhl, 1985). It leads to the optimization of resource use and output management, increase in farm income, growth of agro-based industries, adoption and spread of new technologies, better living, and creation of utility. An increase in the efficiency of the marketing process, which results in lower

cost of distribution and lower prices to consumers, might bring about an increase in the national income (Jema, 2008).

An efficient marketing system may contribute to an increase in the market supply by scaling down the losses arising out of the inefficient processing, storage, and transportation (Jema, 2008). It guarantees the farmers better prices for their products and induces them to invest their surpluses in the purchase of modern inputs so that productivity may increase (Kohls and Uhl, 1985).

However, this marketing system is influenced by various factors (Christopher *et al*., 2014). Poor infrastructure, marketing aspect which respect to both time and place, high product , limited storage facilities, lack of market access and lack of transportation facilities. When this condition becomes performed at efficiently, it is expected to increase the efficiency of both marketing and production as they reduce transaction costs and ensure more competitive pricing conditions in marketing than would occur in their absence (Christopher *et al*., 2014).

Till recently *Teff* market was almost wholly domestic within Ethiopia. But now with an increased globalization and labor migration, *Teff* began to be exported to the Middle East, North America and Europe to satisfy the demand of Ethiopians abroad (Demeke and Marcantonio, 2013; FAO, 2015). Furthermore, because of its nutritional properties high in fiber, calcium, iron and increasing demands in European and North American markets (FAO, 2015). The volume of export has fluctuated and relatively a larger quantity was exported in 1995-97, 2000 - 03, and 2005. Export has declined since 2006, mainly due to high domestic prices and a government ban on export (Demeke and Marcantonio, 2013). Generally, *Teff* marketable surplus shares are 29% of the total production. And its supply chains are long and complex.

But the main problems facing farmers within their production and marketing aspect of Teff in developing countries in general and in the study area in particular are low prices, unstable prices, unreliable market, price strategies and lack of appropriate market information. Due to this, markets do not develop automatically and the lack of a well-functioning market can increase risks and costs for farmers and other market participants (Adiyogas, *et al.*, 2001).

2.2. Review of Empirical Literature

The numbers of studies pointed out on, “factors affecting market supply of agricultural commodities” are indicated as follows;

Tadele et al., (2016) identified the major factors affected Teff and Wheat market supply in Dendi Woreda using multiple linear regression models. Their study revealed that, among eleven variables hypothesized to affect the household level marketable supply of Teff and Wheat, only five variables namely (quantity produced, age and market access, experience and price) were found to be significant while (education, quantity produced and extension access) were found significant for Wheat.

Wolday (1994) identified major factors that affect Teff and wheat at Alaba Siraro Woreda. He adopted multiple regression analysis with both dummy and continuous variables as independent variables to capture the influence of the independent variables on the market supply of food grain. He found out that, the size of output, access to market and family size affected market supply of food grain. He studied the relationship of farm level market supply of the cereals using cross-sectional data.

Muhammed (2011) identified Market Chain Analysis of Teff and Wheat Production in Halaba Special Woredausing multiple linear regression models to estimate the determinants of Teff and Wheat supply. His study revealed that, among the different variables hypothesized to determine the supply of Teff and Wheat; quantity produced, access to market information, access to extension service and sex of the household head significantly affected the volume of Teff supplied to the market and three variables namely quantity produced, access to credit and price of other (pepper) crop significantly affected volume of Teff supplied to the market.

Girma (2015) conducted a study on determinants of marketed surplus of *Teff* the case of Baku Woredain South-West Shewa Zone, Oromia National Regional State, Ethiopia, using multiple linear regression models. The result indicated sex, land allocated for *Teff*, market information, and frequency of contact with extension agents on *Teff* production and marketing had a significant effect on the volume of *Teff* marketed in his study area.

Based on the above empirical literature reviews, one can conclude that, most of the factors that affect the supply of agricultural commodities are differing from one crop to the other commodities. Therefore, this study attempted to give current information on structure, conduct and performance of Teff markets and the determinants of Teff market supply in Adola Rede Woreda.

2.2.1. Market chain of Teff in Ethiopia

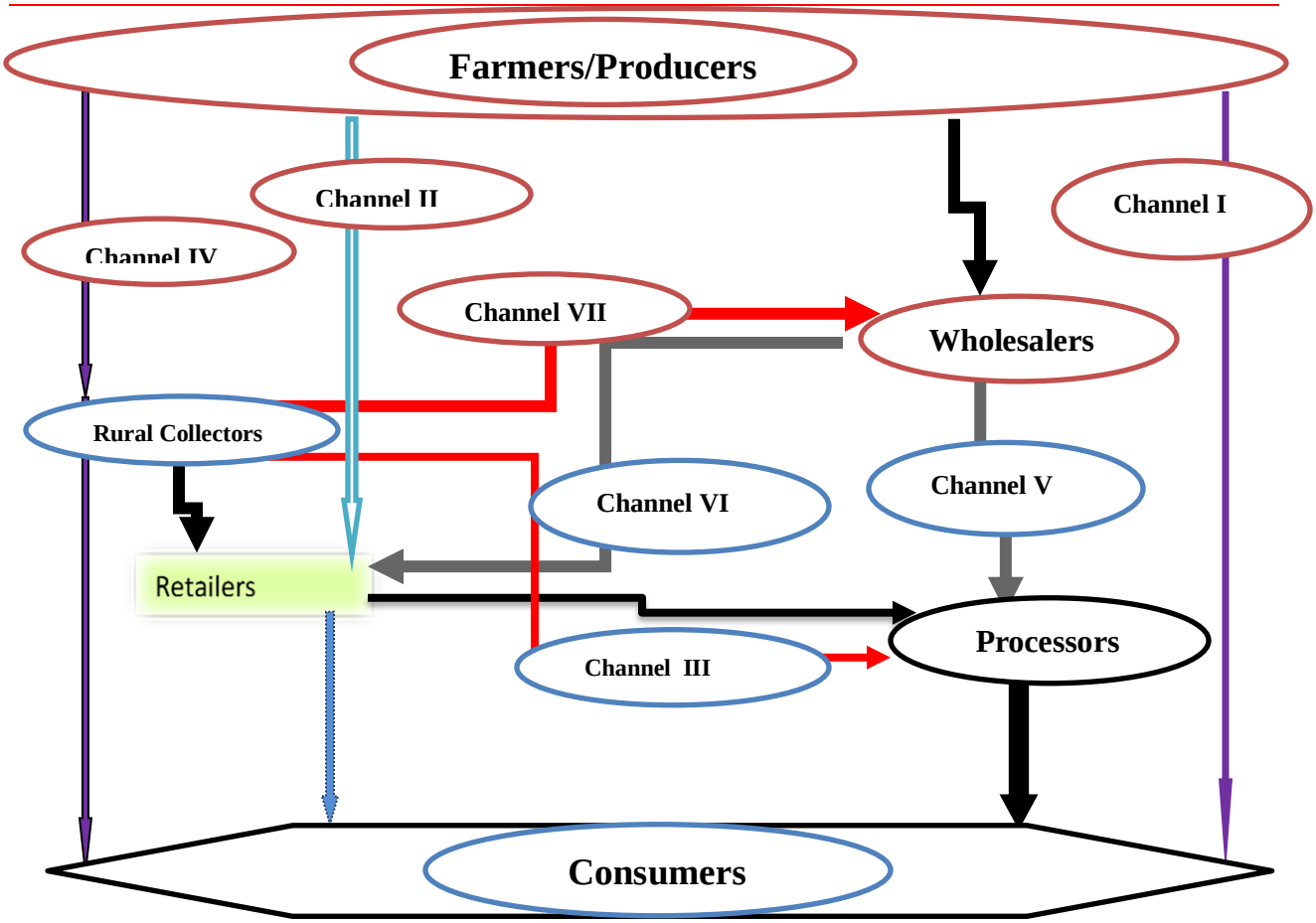
Marketing Channels of Teff

A marketing channel is businesses structure of interdependent organizations that originates from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstrong, 2003). The analysis of marketing channels is intended to know the alternative routes the product follow from the point of origin to final destination.

Table2, Marketing channels and their definitions

Commodity channels	Definitions
producer (farmers)	The first stage actors in the chain who perform most of the market chain functions right from farm inputs preparation on their farms or procurement of the inputs from other sources to post harvest handling and marketing.
Local Collectors	are farmers or part-time traders in the chain who buy small quantity of Teff from farmers in village markets during slack period for the purpose of reselling it to consumers or wholesalers
Wholesalers;	Wholesalers are traders who buy large quantities of goods and resells to retailers than selling directly to the ultimate customers. They are the major actors in the marketing channels. They have somewhat strong financial as well as management-know how in all aspects of the business activity in comparison with other actors.
Retailers	Retailers buy the Teff from farmers' directly or through broker in the market. They directly sells commodity to end users (consumers and processors).
Consumers	They are the final stage actors. They are market actors who purchase either raw Teff or processed Teff for their own consumption directly from producer, collector, retailers or processors for consumption or they have many alternatives as they are the final destination of the products.

Figure 2. Teff Marketing Chain in Ethiopia



Source; Adopted by Wase 2018,(own sketch)

Channel-I: Farmers → Consumers

This is a channel in which the farmers sell the Teff they produced directly to consumers.

Channel-II: Farmers → Retailers→ Consumers

The channel in which, retailers buy Teff directly from farmers and they in turn sell directly to the consumers. In this case the raw Teff is sold to consumers by the retailers without any processing is carried out.

Channel-III: Farmers → Retailer → processors →Consumers

This channel is the channel in which farmers sell the Teff they produced to the retailer and the retailers sell without any value addition to the processors; processors resell it by adding some amount of value to consumers.

Channel-IV: Farmers → Collectors → Processors →Consumers

This channel is the channel in which farmers sell the Teff they produced to the collectors and they sell without any value addition to the processors; processors resell it by adding some amount of value to consumers.

Channel-V: Farmers → Wholesalers → Processors →Consumers

This is the channel in which wholesalers buy Teff directly from farmers and they in turn sell directly to the processors. In this case the raw Teff is sold to consumers by the processors after value addition processing is carried out.

Channel-VI: Farmers → Wholesalers → Retailers →Consumers

This is the channel in which wholesalers buy Teff directly from farmers and they in turn sell directly to the retailers. In this case the raw Teff is sold to consumers by both the retailer and Wholesalers without value addition process.

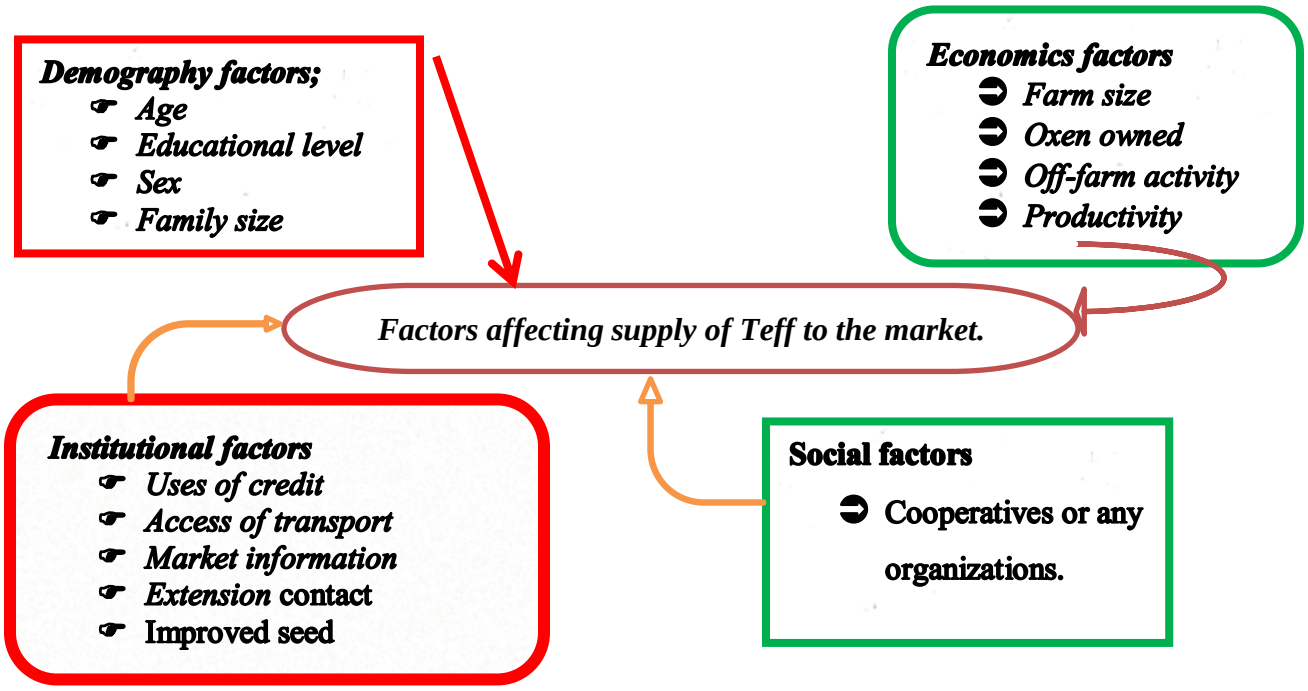
Channel-VII: Farmers → Collectors → Wholesalers →Processors→ Consumers

This channel is the channel in which farmers sell the Teff they produced to the collectors and the collectors sell without any value addition to the wholesalers and wholesalers resell it to the processors without value addition process. In turn the processors sell it by adding some amount of value to consumers.

2.3. Conceptual Framework of the Study

The figure below depicts, the effects of demographic, economics, institutional and social factors on market supply of producers.

Figure3. Conceptual Framework of the study



Source; Wase 2018,(own sketch)

3. RESEARCH METHODOLOGY

3.1 Description of the Study Area

3.1.1. Location

Adola Rede Woredais located in East Guji Zone of Oromia Regional State, with an estimated area covering 1401 square kilometers. It is located at 475 km away from Addis Ababa, the capital city of Ethiopia and 142 km away South West from Hawasa, the capital city of South Nations, Nationalities, and Peoples Region. It is boardered on the South and East by the Shakiso Woreda, on the west by Wadera Woreda and on the North by Annaa Sorraa Woreda. Topographically, the Woreda is located at an elevation of 1500 to 2500 meters above sea levels and the Woreda also located at latitude and longitude of $6^0$12'38"N and $39^0$12'37"E respectively ARDAO (2019). Geographical location of the study is shown in figure 4 below.

3.1.2. Population

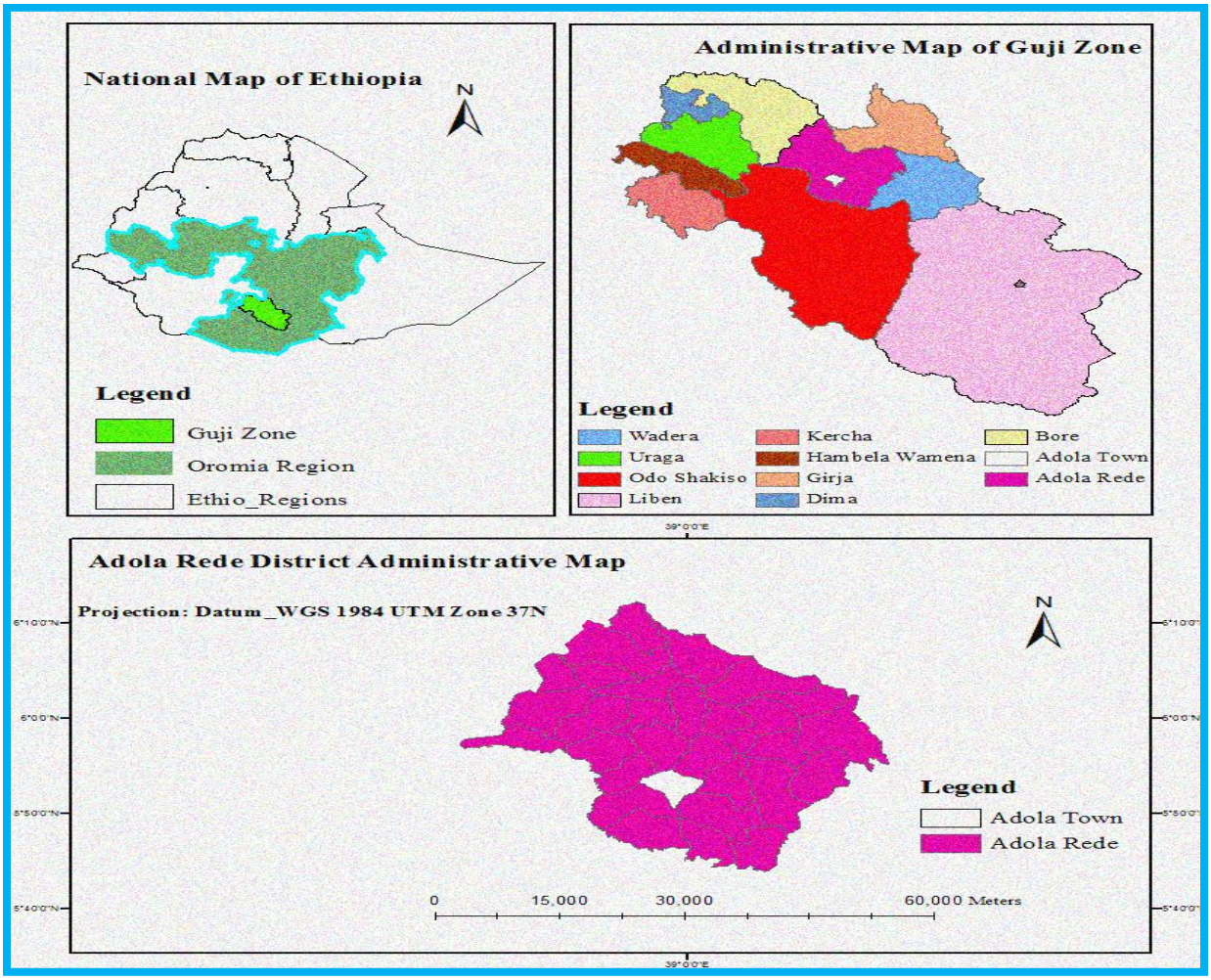
The Woreda consists of 3 Urban and 28 Rural Kebeles with an estimated total population of 149,735 of which 77,862 are male and 71,873female (CSA, 2015). From the entirely population Men are 52% and the remaining 48% are Females.

3.1.3. Climatic Condition

According to the classification used in Ethiopia, the climatic condition of the Woredais characterized as Woina Dega climatic Zone. The area receives a bimodal rainfall where the high rains are between August to October and the small rains are from February to April. However, during the main rain, all crops grown in the area are planted including Maize, Teff, Wheat, Sorghum, but Teff crop is intolerant to excessive rainfall. The best time for sowing period is found to be from beginning of September to mid October when cultivated as rain fed crop. Maturity depends on the weather condition and it is usually varies from 90-115days, the harvesting time found to be from the beginning of January to February. The Woreda has 33 percent, 24 percent, 30 percent, 20 percent and 17 percent of arable, under cultivation, pasture, forest and the other considered as swampy, degraded or otherwise unusable, respectively. Temperature of the area ranges between 12^oc and 18^oc with an average of mean annual Temperature of about 20^oc. the mean annual rainfall is 1700mm. Lowland, Midland and

Highland agro-ecological zones characterize the Woreda's climate. The soils of the area are believed to be a relatively fertile and during good rains farmers can harvest good yield even without fertilizer application (ARDAO 2019).

Figure 4: Map of the study area



Source: Tariku (2017)

3.1.4. Social Services, Economic Activities and Livelihood

The major social services available in the Woreda are Water supply and Electric power (to some extent), Education, Health, Road. The economic sector of the Woreda is mainly composed of Trade, and Agriculture. The economic contribution of the Trade sector to the Woreda is significant next to agriculture (ARDAO, 2019).

3.3. Sources and Methods of Data Collection

In order to collect the reliable data, both primary and secondary sources of data were used. The primary data was collected from farmers (sample households of Teff producers), traders and the others those who have a relationship with this focus area, using unstructured questionnaire, personal observation, oral interview, and key informant Interview. Secondary data was collected by reviewing documents of secondary sources namely: Adola Woreda Office of Agriculture, and Office of Trade. Beside to Woreda offices information, published and unpublished documents, bulletins and websites were visited to generate relevant secondary information focusing on Teff marketing.

3.4. Sampling Technique and Sample Size Determination

The smallholder Teff producers and other actors (i.e. Traders) along the Teff market chain were the basic sample unit of this study. Multistage sampling procedure combining both purposive and simple random sampling was used to identity farmers to include in the sample. In the first stage out of fourten rural Woredas of Guji Zone, Adola Rede Woreda is selected purposively as it is one of the highest Teff producing Woredas in this zone. The Woreda has four Urban and 28 Rural Kebeles. In the second stage, from the total of 28 Rural kebeles of the Woreda, three Teff producing kebeles were selected randomly because of homogeneity of production. Finally, among total 1,943 of Teff producer household heads that exist in three kebeles namely; *Gunacho, Bilu and Orone,* 121 samples of household heads were selected randomly using probability proportionate to size. And also 13 traders were selected purposively. Sample size was determined following a simplified formula provided by Yamane (1967). Accordingly, the required sample size at 95percent confidence level with degree of variability of 5percent and level of precision equal to 8.9 percent was used to determine a sample size required to represent the population.

I .e. 8.9 percent level of precision used here is to manage the sample size that fit the number of explanatory variables, because, with the simple '**rule of thumb'** the sample size should be 10 for each independent variable, due to this, the researcher need to have at least a minimum of 120 sample.

The sample size for the study was determined by Yamane (1967).

$$n = \frac{N}{1+N(e)^2}$$ N=**1,943**, Then the sample size (n) =121

Where, 'n' is the designed sample size, 'N' is the total number of Teff producer household heads and 'e' is the level of precision (margin of errors) at 8.9 percent.

Table3. Sample distribution of Teff producers in selected kebeles

Nº	Kebeles	Total number of Teff producers	Number of sample household selected
1	Gunacho	670	48
2	Orone	608	33
3	Bilu	665	40
	Total	1943	121

Source: ARDAO (2019).

3.5 Methods of Data Analysis

Different types analytical methods were used to evaluate the research results and make a sound conclusion for a given survey information. In this study, data was analyzed using Econometrics, Descriptive and Inferential statistical methods.

3.5.1 Descriptive statistical Analysis

Descriptive analysis such as mean, standard deviation, ratio, frequency and percentiles is used in order to explain and interpret the data obtained from sampled households and trader's socio-economic characteristics, structure, conduct and performance of Teff markets. The collected raw data were analyzed by using the STATA version 13. The indicators which were used in this part of the analysis are as follows:

Structure – Conduct -performance (S-C-P)

This model is an analytical approach used to study how the structure of the market and the behavior of sellers of different commodities and services affect the performance of market, and consequently the welfare of the country as a whole (Kizito, 2008).

The model examines the causal relationships between market structure, conduct and performance, and is usually referred to as the structure - conduct - performance (S-C-P) model. It

is based on the theory that the structure of a market (S) determines market conduct (C), which then determines market performance (P), and that higher concentration ratios generate welfare losses by competition restricting activities (Abbott and Makeham, 1981). Many researchers that conducted their research on market area used this model. Therefore, this study used this model to evaluate the efficiency of Teff market in the study area.

Market structure: Market structure consists of the relatively stable features of the environment that influence the behavior and rivalry among the buyers and sellers operating in a market (Branson and Norvell, 1983). For example, if the market structure is characterized by high barriers to entry, it may result in only a few traders profitably maintaining the business activities. These few traders may engage in noncompetitive behaviour such as collusion and exclusionary or predatory price setting behavior. These non-competitive behaviors can result in excessive profits and widened marketing margins for traders. The major structural elements which are most critical to performance analysis are the following:

Market concentration: this refers to the number and size, distribution of sellers and buyers in the market. The greater the degree of concentration the greater will be the possibility of noncompetitive behavior, such as collusion existing in the market (*Pomeroy and Trinidad, 1995)*. Which means that when there are few buyers and sellers, they may engage in noncompetitive behaviors such as collusion and price discrimination When there are few buyers of a commodity, traders offer sellers low prices which reduce the income of sellers. If there are few sellers of a commodity in the market, then sellers gain market power and increase prices, which reduce the amount of commodity that buyers can purchase with a given amount of income, therefore, making them relatively poorer than if prices were lower. The most commonly used measure of concentration indices are:

Concentration ratio (CRr): This measure shows the proportion of the industry's output accounted for by r largest firms:

$C = \sum_{i=1}^{r} Si$ Where;- i=1, 2, 3, 4……..r,

C- is concentration ratio, Si- is market share firm i^{th} and r- Number of largest firms for which the ratio is going to be calculated.

$Si = \frac{Vi}{\Sigma Vi}$ Where, Si = market share of firm i; Vi = amount of product handled by firm i; and ΣVi =Total amount of the product supplied to the market.

In this regard, Kohls and Uhl (1985) bring into play as a rule of thumb, four largest enterprises' concentration ratio of 50percent or more (an indication of a strongly oligopolistic industry), 33-50 percent (a weak oligopoly) and less than that (competitive or non-concentrated industry).

Barriers to entry: Barriers to market entry include a number of different factors that restrict the ability of new competitors to enter and begin operating in a given industry. The major source of barriers to enter in to the market are; Economies of scale, Natural factor endowments, exclusive knowledge on factor of production, Product differentiation, Capital requirements, Switching costs, Access to channels of distribution, Government policy, etc.

Market conduct: it is the patterns of behavior that traders follow and how they adjust to changing market conditions. Meijer (1994) said that, "conduct is pattern of behavior which enterprises follow in adopting or adjusting to the market in which they sell or buy", in other words the strategies of the actors operating in the market. For example, in an environment where there are many buyers and sellers, the market tends to determine the price. If one trader tries to increase his or her price, he or she sells nothing. This means that households buy food commodities and agricultural inputs at prices that equal to the costs of producing the last unit of the commodities (marginal cost). In contrast, if there are only a few sellers of food commodities in a market, these few traders can collude and charge consumers higher prices, up to the level where consumers can afford to buy from nearby market at a lower cost.

Market Performance

Market performance refers to the impact of structure and conduct on prices, costs, and volume of output (Pomeroy and Trinidad, 1995). Marketing efficiency is essentially the degree of market performance. It is defined as having the following two major components: (i) the effectiveness with which a marketing service would be performed and (ii) the effect on the costs and the method of performing the service on production and consumption. These are the most important because the satisfaction of the consumer at the lowest possible cost must go hand in hand with maintenance of a high volume of farm output (Ramakumar, 2001). The two approaches to

measure marketing performance are: **marketing margin** and the analysis of **market channel efficiency.**

Marketing Margin: In a commodity subsystem approach, the institutional analysis is based on the identification of the marketing channels. This approach includes the analysis of marketing costs and margins (Mendoza, 1995). A marketing margin can be defined as a difference between the price paid by consumers and that obtained by producers; or as the price of a collection of marketing services that is the outcome of the demand for and supply of such services (Tomek and Robinson, 1990). It measures the share of the final selling price that is captured by a particular agent in the marketing chain (Mendoza, 1995).

Marketing margin is most commonly used to refer to the difference between producer and consumer 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, wholesale and retail, prices (Scarborough and kydd, 1992). The size of marketing margins is largely dependent upon a combination of; the quality and quantity of marketing services, and the efficiency with which they are undertaken and priced. The quality and quantity of marketing services depends on supply and demand of marketing services and/or the degree of competition in the market place. The costs of service provision depend on both exogenous and endogenous factors and the efficiency are determined by the extent of competition between marketing enterprises at each stage.

The total marketing margin is the difference between what the consumer pays and what the producer/farmer receives for his product. Computing the total gross marketing margin (TGMM) is always related to the final price or the price paid by the end consumer and is expressed in percentage (Mendoza 1995).

$$TGMM = \frac{Pc - Pp}{Pc} \times 100$$

Where, TGMM = Total gross marketing margin, P_c = Consumer price (end buyer price); andP_p = Producer price (first seller price)

It is use full to introduce here the idea of "producer participation", "producer portion" or "producers gross marketing margin" (GMMP) which is the proportion of the price paid by

consumer that belongs to the producer. Producer that act as a middle men also receive an additional marketing margin.

$$GMMP = \frac{Pc-TGMM}{Pc}\text{X}100$$

$GMMP = 1 - TGMM$ Where; GMMp = the producer's share in consumer price

The net marketing margin (NMM) is the percentage of the final price earned by the intermediaries as their net income after their marketing costs are deducted. The percentage of net income that can be classified as pure profit(i.e. return on capital), depends on the extension to such factors as the middlemen's own (working capital) costs.

$$\text{NMM} = \frac{Grossmargin-Marketingcost}{Pricepaidbytheconsumer} * 100$$

Where, NMM = Net marketing margin

Higher NMM or profit of the marketing intermediaries reflects reduced downward and unfair income distribution, which depresses market participation of smallholders.

3.5.2 Econometrics Analysis

Common and important econometric models which is Multiple Regression Model was applied to determine and predict the current qualitative findings and their effects on factors affecting quantity of Teff supplied to the market. Accordingly, STATA version 13 was used for testing hypothesis related to the objective of the study.

Multiple linear regressions to analyze market supply of Teff;

In this study multiple linear regressions were employed. Multiple linear regressions take into account the inter-correlations among all variables listed below. This method is used to determine if the independent variables explains the variance in dependent variable. Since, Teff is a cash crop that all farmers in this area decided to produce for selling purpose in order to earn cash. Therefore, all the sampled Teff farmers of the study area supply Teff to the market and the dependent variable which is amount of Teff supplied to the market is a continuous variable. Hence, multiple linear regression models fit to survey data to identify the determinants of Teff

supply to the market. Following (Greene, 2000), econometric model specification of the multiple linear regression models in matrix notation is:

$$\gamma_i = \beta_{Xi} + \varepsilon_i$$

Where: Yi = Teff supplied to the market and "i" = 1, 2, 3, 4…, B_i = a vector of estimated coefficient of the explanatory variables, X_i = a vector of explanatory variables, μ_i = disturbance (error) terms

Model Specification $Y_i = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12})$

➲ Therefore the equation was;

$$\boldsymbol{\gamma = \beta_0 x_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \beta_{11} x_{11} + \beta_{12} x_{12} + \varepsilon_i}$$

✍ Where; Y = Quantity of Teff Supplied to the Market

X_1 = Price of other crops

X_2 = Family size

X_3 = Number of Oxen owned

X_4 = Improved seed

X_5 = Distance to the nearest market

X_6, = Educational level of house headed

X_7, = Frequency of Extension Contact

X_8, = Utilization of Credits

X_9, = Experience of Household

X_{10}, = Income from non-farm activity

X_{11}, = Membership to cooperatives

X_{12}, = Price Information

☞ *β_0, β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9, β_{10}, β_{11},and β_{12}, are the coefficients associated with each independent variable, which measures the change in the mean value of y, per unit change in their respective independent variable. Regress quantity of Teff supplied to the market (as dependent variable) on the selected linear combination of independent variables using multiple regressions.*

Specification of errors

Multicollinearity problem among continuous variables and check associations among discrete variables, which seriously affects the parameter estimates was tested. According to Gujarati (2003), **multicollinearity** refers to a situation where it becomes difficult to identify the separate effect of independent variables on the dependent variable because of existing strong relationship among them.

The two measures that are often suggested to test the existence of multicollinearity are Variance Inflation Factor (VIF) and Contingency Coefficients (CC). Thus, Variance Inflation Factor (VIF) is used to check multicollinearity among continuous variables. As a rule of thumb, if the VIF is greater than 10 (this will happen if R^2 is greater than 0.90), the variable is said to be highly collinear (Gujarati, 2003). A measure of multicollinearity associated with the variance inflation factors is computed as:

$$VIF\ (X_i) = (1\text{-}R_i^2)^{-1}$$

Where, Ri^2 is the multiple correlation coefficients between explanatory variables, the larger the value of Ri^2 is, the higher the value of $VIF\ (X_i)$ causing higher collinearity in the variable (X_i).

Contingency coefficient is used to check multicollinearity or association between discrete variables. The value ranges between 0 and 1, with 0 indicating no association between the variables and value close to 1 indicating a high degree of association between variables. A popular measure of multicollinearity associated with the CC is defined as:

$$cc = \sqrt{\frac{\chi^2}{N + \chi^2}}$$

Where, CC is contingency coefficient, $\chi 2$ is chi-square test and N is total sample size. If the value of CC is greater than 0.75, the variables are said to be collinear. Using these two

Therefore, Multicollinearity problem among continuous variables and associations among discrete variables, was checked using VIF and CC.

Heteroscedasticity was undertaken for this study. There are a number of test statistics for detecting heteroscedasticity. Among them are Park, Breusch-Pagan, Godfrey, White's testes, Koenker Bassett (KB) test of heteroscedasticity. However, According to Gujarati (2003) there is no ground to say that one test statistics of heteroscedasticity is better than the others. Therefore, due to its simplicity, Breusch-Pagan (BP) test of heteroscedasticity was used for this study.

3.6.2. Definition of variables and Working hypothesis

Dependent variable:

Quantity of Teff Supplied to the Market (QNT-SUPPM): It was a continuous variable that represents the dependent variable and the actual supply of Teff by individual households to the market, which is measured in kilograms in 2017/18 production year.

Independent variables:

The following explanatory variables were hypothesized to influence the marketed supply of teff in the study area.

Price of other crop (PR-OTHC): It is continuous variable that can be measured in Birr per quintal. According to (Mohammed, 2011), an increase in price of other crops produced in the farm is expected to have negative effect on supply of Teff. In this case, price of Wheat was taken as variable since it was important potential substitute of Teff crop in the study area. Therefore, Price of other crop was hypothesized to affect the household level of Teff market supply negatively.

Family size (FMSIZE): It is a continuous variable and measured in terms of adult equivalent. A household with more number of family members was assumed to supply less amount of *Teff* to market than those households with relatively less number of family members because of the increase in consumption. Having more household members reduces the proportion of output that going to the market because of households with large member tend to consume more of what they have produced and less is available for sales (Efa et al., 2016). Therefore, family size was hypothesized to affect the household level of Teff market supply negatively.

Number of oxen owned by household (N-OXEN): it is a continuous variable that was measured by taking into consideration the number of oxen owned by the head of the household and expected to affects the marketable supply of Teff positively (Girma, 2015).

Improved seed (IMP-SEED): it is a dummy variable and takes a value of 1 if a farmer uses improved seed and 0 otherwise. Improved seeds are associated with high productivity level and better capacity to resist diseases (Abay, 2007). Therefore, use of improved seed is expected to have positive effect on Teff market supply.

Distance to market (DISTMARKET): It is a continuous variable and was measured in kilometers which farmers spend time to sale their product to the market. As the distance from the

nearest market increases, variable transport costs increase and this discourages smallholder farmers from selling high volumes of teff *(*Efa 2016). Hence, it was hypothesized that, market distance affects volume of sales negatively.

Education Level of household head (EDUHH) : It is continues variable and measured using years of formal schooling of the household head and hypothesized to affect market supply positively. It is believed that, if a farmer attained formal education of any level, there is a tendency to accept technologies that will increase production which has direct relationship with supply to the market. Zekarias *et al.* (2012) indicated that, education positively affected the market supply of coffee. Therefore, education level of the household head was hypothesized to affect Teff supply at farm household level positively.

Frequency of extension contact (FREQ): It is a continuous variable measured in number of visit (in a month) by the farmer to Development Agent (DA). Farmers that have frequently contact with DAs (development agents) were have better access to information and could adopt better technology that would increase their market supply of Teff. extension services was found to be essential in disseminating improved methods of farming which are important in increasing agricultural productivity (Njane et al., 2007). In this regard, extension is assumed to have positive contribution to farm level market supply of Teff.

Utilization of credit (UTCR): Utilization of credit is measured as a dummy variable taking a value of '1' if the household used credit and zero otherwise. Among other things, credit utilization is assumed to have a positive significant to the market supply of Teff, because a farmer who get credit service can purchase inputs and improved varieties and hence increase the production and market supply of Teff and supply Teff to alternative market at the Woreda level (Mohammed, 2011).

Farming experience of the household (EXP-HH): it is a continuous variable measured in number of years in Teff production. A household with better experience in Teff farming is expected to produce more amounts of Teff than the one with only less experience and, as a result, Teff producing farmer is expected to supply more amounts of Teff to market. Therefore, experience in Teff production was expected to have positive relation with farm level market supply of Teff. Abay (2007) found that as farmer's experience increases the Agricultural product

supplied to market increases in Fogera. Therefore, there is a direct relationship between experience and the supply of Teff to the market.

Income from non-farm activity (INCOME): It is a dummy variable measured in terms of whether the household obtained income from off and non-farming activities. It is '1' if the household is involved in non/off-farm activities and '0' otherwise. The study was hypothesized that, if the earning from the non/off-farm income is higher than the Teff production, mostly the farmers shift towards the non-farm income activities. Therefore, it hypothesized to influence the volume of Teff supply to market negatively.

Membership to cooperatives (MEMB-COOP): This is a dummy variable that takes the value 1 if a household is a member of cooperatives and 0 otherwise. This variable was expected to affect the household supply of Teff positively. Because, producers those are member of local organization are likely to get inputs and market information and thus could supply more Teff to the market than nonmembers. Households belonging to coffee cooperative were easily access information about the price product and beneficiary from profit dividend in the future in addition to actual current price offered by cooperative which is comparable with other market outlet Engida (2017).

Price Information (PR-INFORM): This is a dummy variable taking value 1 if farmers have price information from radio, newspaper, or information board, and 0 otherwise. This is an important variable in any marketing because price information highly influences the commodity prices, and hence has a significant impact on the amount of Teff market supplied. Therefore, it is hypothesized that access to price information positively affects the amount of Teff supplied to the market because as farmers accessed market information, the quantity of teff sold at market also increases (Tadele, 2016).

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Table4. Description of the dependent and independent variables used in the model.

Nº	Variables	Types	Unit measurement	Exp. sign
1.	Price of other Crops	Cont.	Birr/quintals	-
2.	Family Size	Cont.	Adult Equ.	+
3.	Nº of oxen owned by HH	Cont.	Number of oxen	+
4.	Improved seed	Dum.	1= if they uses, Otherwise=0	+
5.	Dist. to the nearest market	Cont.	Km	-
6.	Edu. level of hh	Cont.	Number of Year	+
7.	Freq. of Extension Contact	Cont.	Number of frequency visited/month	+
8.	Utilization of Credits	Dum.	1=if farmers used credit Otherwise=0	+
9.	Experience of Household	Cont.	Numbers of Years practices	+
10.	Price information	Dum.	1= if farmers have price information, otherwise=0	+
11.	Cooperatives	Dum	1=if they are Members otherwise=0	+
12.	Off- farm Income	Cont.	Dummy	-

4. RESULTS AND DISCUSSIONS

This chapter presents the results and discussions on the core findings of this study. Thus, it is organized in to two sections. The first section provides descriptive analyses on the socio demographic characteristics of sampled households, and the structure, conduct and performance of market. The second section is about econometric analysis in factors affecting Quantity of Teff Supplied to the Market using Multiple Linear Regression model.

4.1. Descriptive Statistics

4.1.1. Demographic and Socioeconomic Characteristics of Teff Producers

The variables used to describe demographic and Socioeconomics Characteristics of sample farmers are, educational level, sex, age and family size, production experiences, Off/Non-farm income, Resource Ownership and Tenure and Others.

4.1.1.1. Education level of respondents

The survey result shows that, about 20.53 percent of the sampled household heads are illiterate. However, 56.94 percent, and 22.22 percent attended primary, and Junior school respectively, whereas none of the respondents attended Secondary school and above in the study area (Table 6). In both theoretical and practical situations, education level plays an immense role in ensuring household access to basic needs such as food, shelter and clothing. Skills and education amplify the working efficiency resulting into more income and food security. Furthermore education is important to manage the business as well as in decision making (Kadigi, 2013).

4.1.1.2. Family size and experience

The mean family size of the total sample households is 3.89 persons. The household provides a major source of labor for crop production. The labor available for work per household is directly proportional to the family size. The respondents have an average of 21.58 years of farming experience in Teff production with a standard deviation of 6.93 years (Table 7).

4.1.1.3. Resource Ownership and Tenure

Land is perhaps the single most important resource/factor of production and measure of wealth in the study area. The average land owned, land rented out, Cultivated Land, and land allotted for Teff by Teff producers are 2.54, 0, 1, and 0.76 hectares respectively (Table 7).

4.1.1.4. Distribution of sampled households by distance from nearest and Woreda market

This refers to the distance from home to the place where they sell their product (Teff). Sampled Teff producing farmers reported that they have to travel an average of 9 km (approximately) with corresponding standard deviations of 3.88. The minimum and the maximum distance that sampled Teff producing respondents have to travel to nearest market centers are 6 kilometers and 15 kilometers, respectively (Table 7). All the Kebele administrations have a nearby Woreda market which is available for two days per week.

Table 6: Demographic and socioeconomic characteristics of respondents for Categorical variables

Variables		Frequency (N=121)	Percent (N=121)
Educational level	Illiterate	23	20.83
	Primary	75	56.94
	Junior	29	22.22
	Others	--	--
Off Farm Income	Yes	31	18.75
	No	90	81.25
Transportation	Yes	52	43.18
	No	69	56.82
Cooperative	No	121	100

Source: Own survey result 2019

Table 7: Demographic and socioeconomic characteristics of respondents for Continuous variables

Variables	Mean	Std. Dev.	Min	Max
Age of farm households	39.10	11.81	21	70
Experience of farm HHs	21.58	6.93	10	39
Family Size	3.88	1.98	1	9.2
Production experience(Years)	21.58333	6.93	10	39
Total owned land(ha)	2.54	0.853	1	6
Total Cultivated land(ha)	1.00	0.35	0.5	2
Total Land allotted for Teff(ha)	0.763	0.264	0.5	1.5
Nearby market(Km)	9.652778	3.881676	6	15
Woreda Market(Km)	9.652778	3.881676	6	15
	Obs.	121		

Source: Own survey result 2019

4.1.1.5. Transport Access

The availability of well-functioning transport network is very important for the respondents. Because, it creates Place utilities and allows farmers to transports their product from surplus areas to deficit areas, and at the same time, to transports product from farm to home, they needs a well-functioning and the existence of quick transport. The result of this study shows that, 43.18 percent of the sampled respondents owned transportations like; motor bike, pack animal, and animal pulled cart whereas majority of them, which is about 56.82 percent of the sampled respondents have no the transportation (Table 6). From this it is concluded that, lack of owning of the transportation is decreased supply of Teff in the study area.

4.1.1.6. Off/Non-farm income activities

In the study area, Trading in livestock or livestock product, Daily worker (labourer), Sales of charcoal, oxen fattening, and petty trade (small shops) are found to be some of the off/non-farm income generating activities in which sampled farmers are participating. From sampled households, about 18.75 percent are participating on off/non-farm income activities because of

shortage of land, and attractive income from off-farm activities whereas, 81.25 percent are not participating on off/non-farm income activities (Table 6). From this the researcher concluded that, since the earning from the non/off-farm income is lesser, so mostly the farmers shift towards the farm income activities.

4.1.1.6. Reasons for engagement in Off/Non-farm activities by sample respondents

Respondents reasons for engaged in Off/Non-farm activities are almost similar across producers and are revealed in Table 5. Largely speaking, sampled respondents reported they engaged in Off/Non-farm activities because of shortage of land (2.78 percent), excess family labor (3.47 percent), and better income or attractive income from off-farm activities (2.08 percent). So these activities are affected supply of Teff to the market to some extent.

Table 5. Reasons for engagement in Off/Non-farm activities by sample respondents

Reason	Frequency	Percent
Shortage of land	4	2.78
Excess family labor	5	3.47
Attractive income from off-farm activities	3	2.08
Total	121	100

Source: Own Survey result, 2019

‘0’ in the table indicate that, sampled respondent who doesn’t participate in Off/Non-farm activities.

4.1.1.7. Livestock production

Livestock production is an integral component of the farming system. Farmers in the study area undertake both crop and livestock production activities. Though livestock holding size varied among the sample farmers, livestock are kept for various economic and social reasons in the study area. The major economic reasons include generation of cash income, food and animal dung (as an organic fertilizer and fuel). Important animals kept by the sample farmers are oxen, cows, heifers, and donkey. Oxen are the main source of farm power for ploughing, harrowing,

and threshing. The sample respondents on average have a pair of oxen (2.11) with standard deviation of 2.29. An average number of sold Oxen and obtained income by household head are 0.69 with standard deviation of 1.25. Additionally, the sampled respondents on average have 0.812 cows with an average income of 2395.8 Birr (table 8 below).

Table 8. Livestock ownership with their corresponding value in 2017/18

Type of livestock	Ave. Nº of owned	Ave. Nº of sold	Average Cash income from sold
Cows	2.67(3.49)	0.812(1.13)	2395.8(3616.2)
Oxen	2.11(2.29)	0.69(1.25)	8363.89(15118.84)
Donkey	1.30(1.25)	--	--

Source: Own survey result, 2019

4.1.1.11. Production of Teff and Major Crops Produced in 2017/18

As presented in Table 9 below, in the study area, Teff is the crop produced with mean 0.78 ha of area coverage and the basis of livelihood. Every farmer produces Teff in his farm and supply to the market. Empirically, the sampled Teff producing farmers confirmed that in addition to Teff, they also produce other farm products like Maize (1.07 ha), Wheat (0.67 ha) and Barley (0.34ha) (Table 9).

Table 9. Major crops produced and marketed by sampled households in 2017/18

Variables	Teff	Maize	Wheat	Barely
Area cultivated(ha)	0.76(0.26)	1.07(0.28)	0.67(0.4}	0.34(0.01)
Quantity produced per ha (qt)	10.25(3.80)	13.47(3.95)	13.36(10.07)	3.25(0.80)
Quantity consumed (qt)	0.24(0.43)	9.77(3.96)	9.01(2.96)	0.24(0.43)
Quantity sold(marketed) per (qt)	4.26(2.06)	3.35(1.20)	4.35(0.97)	3.01(0.37)

Source: Own survey result 2019 Numbers in parenthesis () indicate Std. dev.

Following Teff, the production of Maize, wheat and Barley are the main source of cash for farmers in the study area. Production of all the crops in the study area is a rain-fed with only once in a year harvest. Table 9 above depicted that, the average land allocated(area cultivated) for the production of Teff, Maize, wheat and Barley by sample Teff producing respondents are 0.78, 1.07, 0.67, and 0.34 hectares respectively with corresponding standard deviation of 0.26, 0.28, 0.4 and 0.01 hectares. The minimum and maximum lands allocated by sample respondents to the production of Teff are 0.5 and 1.5 hectare respectively. In the study area, of the total volume of Teff produced, 97.3 percent of Teff are supplied to the market. Sampled respondents also reported that, the average amount of Teff marketed per household head is 10.25 quintals. The corresponding standard deviation is 3.80 quintals.

4.1.1.12. Main Source of Labor for *Teff* Producers

As indicated in table 10 below, 23.61 percent sampled respondents' main source of labor are their own family, followed by a combination of family and hired labor which is 76.61percent. Since labor is an input for the improvement of production and productivity of a crop, for our case, Teff producers used all other sources of labor in addition to their family labor.

Table10. Main sources of labor for sample Teff producers

Source of labor	Family	Hired	family and hired	Total
N (Freq.)	23	0	98	121
Percent (percent)	23.61	0	76.39	100

Source: Survey result, 2019

4.1.1.13. Farm Inputs utilization

Fertilizer application is one of the most important agricultural practices that are used by Teff growers in the study area. Moreover, proper application of the recommended fertilizer rate is important to obtain the required production and productivity. Farmers (Teff producing sampled respondents) in the study area used 100percent DAP fertilizer rate ranging from 50kg to 100kg per hectare, which is related with a proper application of the recommended fertilizer rate to obtain the required production and productivity. In the study area, 38.8 percent of Teff producing sample respondents are Used DAP 50 kg/ha, whereas, the rest 61.11percent are Used DAP 100 kg/ha (table 11).

Table 11, Agricultural input used by Teff producers

Variables	N (freq.)	Percent
DAP used 50 kg/ha	45	38.89
DAP used 100 kg/ha	76	61.11
Total	121	100

Source: Survey result, 2019

4.1.1.14. Access to Institutional Service of the Farm Households

Utilization of credit service: Finance is the crucial element that can be used for running the production and the marketing of the product and one way of improving smallholder farmers' ability of Teff production and productivity. Farmers with access to credit may minimize the effect of financial constraints and able to buy the necessary inputs which improves their Teff productivity more readily than those with no access to credit. Therefore, it is expected that using of provided credit can increases the production of agricultural crops in general and Teff in particular in the study area. As depicted below in Table 12, only 47.92 percent of sampled producers had got credit in study area and the main objective of the credit is to purchase inputs such as fertilizer, improved seeds and Farm livestock. Additionally, the only major source of credit in the study area is Oromia Savings and Credit institutions (OSCI).

Table12. Taking of provided credit by OSCI to sampled households (1=Taken, 0= Not Taken)

Variables		Frequency	Percent
Credit	Taken	58	47.92
	Not taken	63	52.08
	Total	121	100

Source: Survey result, 2019

4.1.1.15. Reasons for not taking credit

As indicated in table13 below, respondents reasoned out that, 52.08 percent of them did not take credit due to high interest rate 12.50 percent, availability of other alternatives 20.14 percent, and

No need. According to the sampled farm households; Land holding, membership, collateral and personal guarantee are the preconditions to get credit in the study area. In taking formal credit, most of sampled respondents perceived problems such as restrictive procedures, group lending system and high interest rates in the study area. Savings and Credit institutions should change specially the practice of "Group lending system" since members in a group cannot have the same thinking level, attitude and commitment as there are personal differences. Hence, this institute should allow individual lending systems. Savings and Credit institutions should also minimize the interest rates that they charge so as to strengthen farm household spirit and the procedures for securing loans must be simplified to support small holder farmers.

Table13. Reasons for not utilizing credit of Teff producers

Reasons	Frequency	Percent
High interest rate	14	12.50
No need	25	20.14
availability of other alternatives	24	19.44

Source: Own survey result, 2019

4.1.1.16. Frequency of extension contact

Frequency of extension contact is also expected to have direct influence on the production and marketing of Teff behavior of the farmers. In order to give effective extension service to the farmers the region assigned Two DAs in each Kebele. The DAs are a graduate of different Universities with Qualification in Two agricultural streams such as Plant Science, and animal husbandry. 20.14 percent the sampled farmers reported that they have been receiving extension contact out of which 90.3 percent received technical advice like seedling, transplanting, harvesting, spacing, compost preparation, post-harvest handling, storage and input use like chemical application, fertilizer application on different types of crop.

Lastly, the government has been attempting to fill the required knowledge gap and achieve food self-sufficiency in the country by placing at least two development agents (DAs) in each Kebeles and building a Farmer Training Center (FTC). The Kebele level development agents are important means of transferring new agricultural technologies and improving the farmer capacity

for innovations. The effort to disseminate new agricultural technologies is influenced by the efficiency of communication between the development (change) agent and the farmers at grass roots level. The survey result indicated that, the average frequency of extension contact of the sampled households is 0.20 times with the standard deviations of 0.40.

4.1.10. Access to market/price information

Farmers have limited information on price prevailing even in the nearby markets. It is assumed that, producers and traders with access to market information can make better decision on how much to produce and supply to the market. However, there is no organized market information system to support farmers in the study area. About 43.9 percent of the sampled farmers had access to market information from different sources and 56.1 percent had no access to market information. The type of information provided is about output price information. About 20.14 percent producers obtained market information from the nearby market, none of the Teff producers obtained price information from the central market before selling the produce. The sampled respondents revealed that the major source of market information in the study area are Other *Teff* farmers (Table 14).

Table 14 Farmers' access to price information

Variables	Teff Growers (N=121)
Nearby market information (Yes, percent)	29, 20.14
Nearby market information (No, percent)	92, 79.86
Central market information (Yes, percent)	0
Central market information (No, percent)	121, 100.00
Sources of information	
Other *Teff* farmers	121, 100

Source: Own survey result, 2019

4.1.2. Demographic and socio-economic characteristics of the sampled traders

Demographic characteristics of traders are summarized in terms of sex, education level, and average experience in Teff trading (Table 15). The survey identified that, all Teff traders are Women. Concerning educational status of Teff traders in the study area, about 76.92 percent of

the traders are attended primary education, and 23.08 percent of them attended junior education. Experience plays an important role in improving trading activities and marketing efficiency. The trading experience of sample traders ranges from 2 up to 7 years. The average year of Respondents' Teff trading experience is 4.92 years.

Table15. Demographic characteristics of sampled Teff traders

Variables		Frequency N=13	Percent N=13
Sex	Male	--	--
	Female	13	100
Educational level			
	Primary	10	76.92
	Junior	3	23.08

Variable	Obs	Mean	Std. Dev.	Min	Max
Experience of Traders	13	4.92	1.8	2	7

Source: Own survey result, 2019

4.1.2.1 **Market Structure of Teff**

In this sub section, the structure of Teff market is presented and discussed with respect to the types of actors and their functions in the chain, the marketing channel of Teff, the degree of market transparency and the degree of market concentration.

Actors and their functions in Teff Market Chain Pattern

The analysis of the market chain of Teff in the study area indicated, the involvement of diverse actors who are participated either directly or indirectly in the production to consumption system of the Teff. These include producers, local collectors, retailers, and final consumers of the product. According to (*KIT, Faida Mali and IIRR, 2006.*), the *direct actors* are those involved in commercial activities in the chain (input suppliers, producers, traders, consumers). Whereas the *indirect actors* are those that provide financial or non-financial support services for the actors in the chain such as credit agencies, business service providers, NGOs, cooperatives, researchers and extension agents.

A. Primary Actors (Direct Actors)

The primary actors in Teff market chain in Adola Rede Woreda identified as Teff producer (farmers), local collectors, retailers, Wholesalers and final consumers of the product.

Producers (Farmers); Teff farmers are the primary actors as well as the first stage actors in the chain who perform most of the market chain functions right from farm inputs preparation on their farms or procurement of the inputs from other sources to post harvest handling and marketing. The major market chain functions that Teff farmers perform include ploughing, planting, fertilization, irrigating, weeding, pest/disease controlling, harvesting and post-harvest handling. With respect to marketing, the Teff producers had several options to sell their product, selling directly or selling through broker to collector (rural collector) and Woreda wholesalers. They transport Teff to the nearest markets (village market) by themselves, either carrying by themselves or using donkeys either using pack animals, or animal driven carts, or else Motor bike. Alternatively, they sell to village collector or rural collectors who assemble Teff from large number of farmers. Some of the farmers in the sample also sell their Teff to the consumers in the Woreda market. Village markets are markets which are closest to farmers' resident, having less marketing facilities such as road, electricity, potable water etc. Farmers sell smaller quantity of Teff on such markets. Whereas Woreda markets are big markets that are found in the Woreda town (Adola and Shakisso) where, most of surplus Teff products are transacted.

Local Collectors; Local Collectors/rural assemblers are farmers or part-time traders in the chain who buy small quantity of Teff from farmers in village markets during slack period for the purpose of reselling it to consumers or Woreda wholesalers in either in rural or Woreda market. Generally, they perform physical function (assembling and storing) of Teff for their loyal customers.

Wholesalers; Wholesalers are traders who buy large quantities of goods and resells to retailers than selling directly to the ultimate customers. They are the major actors in the marketing channels. These actors are located in the middle upper part of the market chain and they have somewhat strong financial as well as management-know how in all aspects of the business activity in comparison with other actors. The wholesalers are either licensed or not, and buy Teff from producers and local collectors. In this Woredas markets, the wholesalers sell the Teff either directly or through commission agents to the different buyers in most cases retailers and

processors. This means that the wholesalers generally participate in marketing of Teff and perform physical (place utility) and facilitating functions (financing).

Retailers; Retailers as direct market actors of Teff are located at the end of marketing chain, directly servicing the last actors (ultimate consumers) in the production to consumption system. They perform numerous marketing functions such as buying, storing, selling and other functions related to marketing. Based on their geographic location, retailers are classified as rural and urban retailers. Rural retailers are market actors in the final link of the market chain and reside on the Woreda town. They buy the Teff from farmers' directly or through broker in the market. Urban Retailers are retailers that sells commodity to end users (consumers and processors). They reside in the Woreda market and buy the product either from wholesalers or urban assemblers or rural retailers.

Consumers; Consumers are the direct actors in the chain. They are the final stage actors or players in the Teff Market chain in the production to consumption system of Teff that purchases the products from producer, collector, retailers or processors for consumption. This means that they are market actors who purchase either raw Teff or processed Teff for their own consumption directly from the producers and or they have many alternatives as they are the final destination of the products. Therefore, they have many options to purchase Teff from the harvesters, local collectors, wholesalers, retailers and processors.

B. Supporting actors

The supporting actors are those who provide supportive services for the actors in the production to consumption system of Teff. The services provided by them include a financial and licensing service which determines the state of success of market chain actors. Accordingly, in the study area, Adola Rede micro finance was the main supporting actor who plays a central role in the provision of a financial service, again woreda's Aricultural offices supports the producers especially by providing them input, improved varieties.

Licensing service*:* Woreda Trade office and Revenue office are the main body responsible for giving license for Teff traders (wholesalers) and collecting revenue through taxation in the Woreda.

Marketing Channels of Teff

A marketing channel is businesses structure of interdependent organizations that originates from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstrong, 2003). The analysis of marketing channels is intended to know the alternative routes the product follow from the point of origin to final destination. Seven (**7**) main alternative channels are identified for Teff marketing. The main marketing channels identified from the point of production to the final consumer through different intermediaries are:

Channel-I: Farmers → Consumers (63Qt kg)

This is a channel in which the farmers sold the Teff they produced directly to consumers. The result in Figure 5 shows that, in this channel about 63 quintals of Teff are transacted/ marketed. This comprises 5.5 percent of the total volume of Teff transacted in the chain. However, this amount is the least one and makes the channel the least in terms of the volume of Teff transacted. As a result the channel stands as the least (7) marketing channels in terms of volume. This could be due to different constraints (e.g. Access to market information, distance from market place, transportation problems, and rural collector's intervention) that the farmers encounter at the time of marketing their produce.

Channel-II: Farmers → Retailers→ Consumers (103Qt)

In this channel, retailers bought Teff directly from farmers and they in turn sell it directly to the consumers. In this case the raw Teff is sold to consumers by the retailers without any processing is carried out. In this channel about 103 Quintals (Figure 5) of Teff are sold. This accounts for 9 percent of the total Teff marketed during the survey period. This channels stands as the 6th important channel in the study area in terms of volume transacted.

Channel-III: Farmers → Retailer → processors →Consumers (141Qt)

In this channel, farmers sell the Teff they produced to the retailer and the retailers sell it without any value addition to the processors; processors resell it by adding some amount of value to consumers. In this channel a total of 141 quintals Teff (Figure 5) are transacted and this account

for 12.3 percent of total volume of Teff transacted/marketed in the study area during the survey period. As a result, the channel is the 5th most important channel in terms of volume.

Channel-IV: Farmers → Collectors → Processors →Consumers (173Qt)

This channel is the channel in which farmers sell the Teff they produced to the collectors and they sell without any value addition to the processors; processors resell it by adding some amount of value to consumers. In this channel a total of 173 quintals Teff (Figure 5) are transacted and this account for 15.08 percent of total volume of Teff transacted/marketed in the study area during the survey period. As a result, the channel is the 4th most important channel in terms of volume.

Channel-V: Farmers → Wholesalers → Processors →Consumers (203Qt)

This is the channel in which wholesalers bought Teff directly from farmers and they in turn sell it directly to the processors. In this case, the raw Teff is sold to consumers by the processors after value addition processing is carried out. In this channel about 203 quintals (Figure 1) of Teff are sold. This accounts for 17.7 percent of the total Teff marketed during the survey period. This channels stands as the 3rd important channel in the study area in terms of volume transacted.

Channel-VI: Farmers → Wholesalers → Retailers →Consumers (211Qt)

This is the channel in which wholesalers bought Teff directly from farmers and they in turn sell it directly to the retailers. In this case, the raw Teff is sold to consumers by both the Retailer and Wholesalers without value addition process. In this channel about 211 quintals (Figure 5) of Teff are sold. This accounts for 18.8 percent of the total Teff marketed during the survey period. This channels stands as the 2nd important channel in the study area in terms of volume transacted.

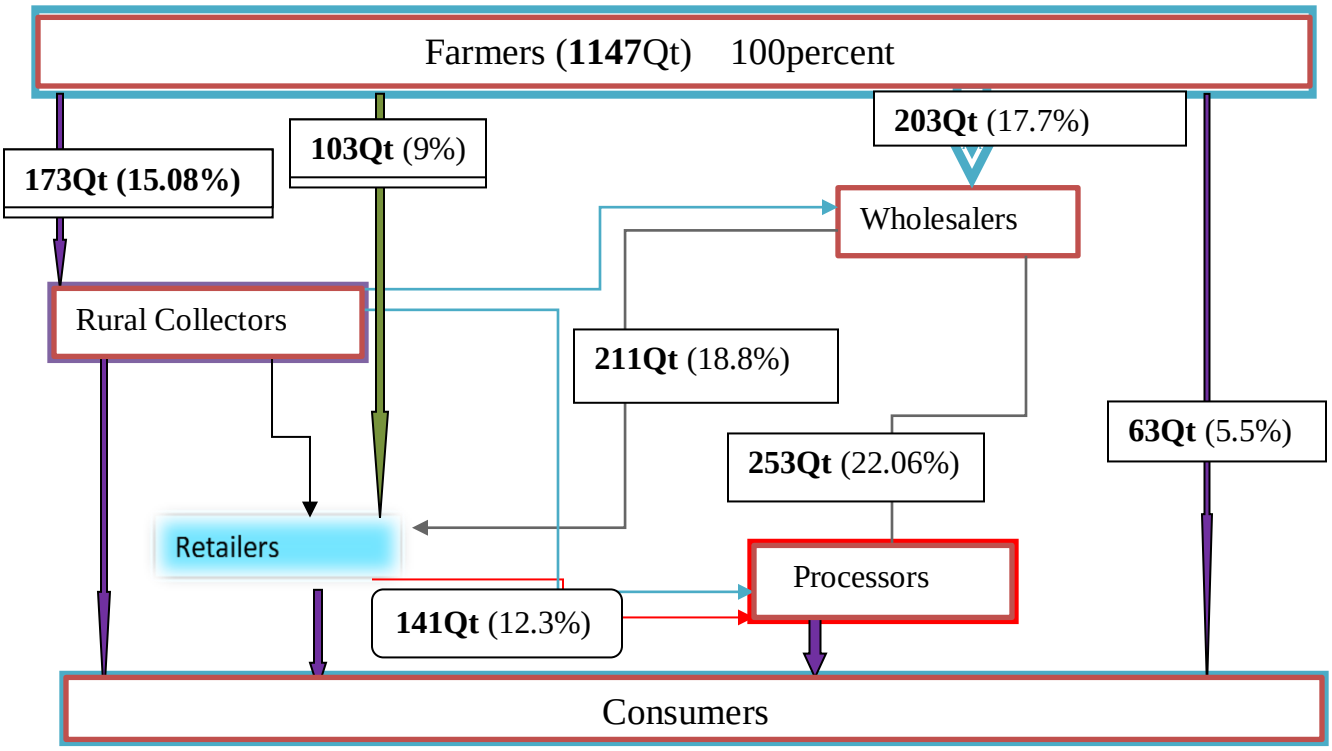
Channel-VII: Farmers → Collectors → Wholesalers →Processors→ Consumers (253Qt)

This channel is the channel in which farmers sell the Teff they produced to the collectors and the collectors sell it without any value addition to the wholesalers and wholesalers again resell it to the processors without value addition process. In turn, the processors sell it by adding some amount of value to consumers. In this channel a total of 253 quintals Teff (Figure 5) are transacted and this account for 22.06 percent of total volume of Teff transacted/marketed in the

study area during the survey period. As a result, the channel is the 1st most important channel in terms of volume.

The comparison made among the channels with respect to the volume of Teff that is transacted through each channel shows that, the Farmers-Collectors - Wholesalers-Processors-Consumers channel is the channel in which the largest volume (i.e. 253qt) of Teff is transacted. This comprises about 22.06 percent of the total volume of Teff transacted. This is followed by Farmers-Wholesalers-Retailers-Consumers channel in which a total volume of 211quintals of Teff are transacted. This amounts to about 18.8 percent of the total amount marketed (Figure 5). In contrast, the farmer/producer - consumer channel is the one that accounts for only 5.5 percent of the total volume of Teff transacted in the chain. As a result the channel stands as the least (7th) marketing channels in terms of volume.

Figure 5. Market Chain Pattern of Teff originated from Adola Rede Woreda, Guji Zone.



Source: *Own draw from data collected, 2019*

4.1.3. Structure-Conduct and performance (S-C-P) of Teff Market

In this section, the findings from the analysis of Teff market structure, market conduct and market performance is presented and discussed. The section is comprised of three subsections. In the first sub section the nature of Teff marketing structure is presented. The second sub section is about the market conduct of Teff. The last sub section deals with the performance of Teff markets.

4.1.3.1. Structure of the Teff market

The structure of the Teff marketing system is evaluated in terms of the degree of market concentration, barrier to entry (licensing procedure, lack of capital and know how, and policy barriers), and the degree of transparency (Pender., *et al* 2004). In this study, the structure of Teff marketing is characterized, using the following indicators: market concentration and entry conditions (licensing procedure, administrative problem and lack of capital).

Measure of market concentration ratio:

Market Concentration Ratio(C), as noted by Shughart (1990) is the numerical index most widely used by industrial organizations for measuring the size distribution of firms in a market. Due to the limited number of traders in their respective locality, Woreda level market concentration ratio is used to analyze the type of markets prevailed in the Woreda. Concentration ratio is calculated by taking partial annual volume of Teff purchased by 13 local traders in 2017/18. The CR4 measures of market concentration ratio showed that, the top four or 20 percent of the traders are controlled 33.33 percent of the Teff market in 2017/18. Such kind of market structure showed that, weak oligopoly market structures this is almost nearest to the competitive market structure.

Table17. Teff trader's concentration ratio in Adola Rede Woreda

Frequency(A)	Cumulative freq.(B)	percent of traders (C) D=A/13	Cumulative percent traders (D)	Total Quantity purchased (E)	percent share of purchase (Si=E/33525)	percent cumulative purchase ($C = \sum_{i=1}^{n} si$)
1	1	7.69	7.69	4009	11.96	11.96
1	2	7.69	15.38	3755	11.20	23.16
1	3	7.69	23.07	3683	10.98	34.14
1	4	7.69	30.76	3323	9.91	44.05
1	5	7.69	38.45	2669	7.96	52.01
1	6	7.69	46.14	2399	7.7	59.11
1	7	7.69	53.83	2292	6.84	65.95
1	8	7.69	61.52	2146	6.40	72.35
1	9	7.69	69.21	2128	6.35	78.7
1	10	7.69	76.9	2122	6.33	85.03
1	11	7.69	84.59	1712	5.11	90.14
1	12	7.69	92.28	1681	5.01	95.15
1	13	7.69	100	1606	4.79	100
13		100		33525	100	

Source: Own Survey result (2019)

Barriers to entry into the Teff market: The barriers to entry into the market reflect the competitive relationships between existing traders and potential entrants. If the barriers to entry are low, new traders can easily enter into Teff markets and compete with established traders. However, with the presence of very high barriers to entry, established firms are difficult to stay longer in business.

Table 18. Entry barrier in Teff marketing

Source of barriers to entry	Frequency	Percent
Lack of capital	8	61.53
Information collusion	5	38.46
Total	13	100

Source: Own Survey result, 2019

Among the total trader respondents, 87.6 percent of them respond that, there is no entry barrier to the market where as 12.4 percent of them explained that there is entry barrier in Teff marketing especially in wholesaling, local Trading business due to shortage of capital (61.53), and information asymmetry(38.46).

Shortage of capital: The survey result indicated that among various barriers to entry into the Teff business, shortage of capital being the first. Since capital is the main source of any business, to enter in the market, more capital is needed. But in the study area shortage of capital is the important barriers to entry into the marketing of Teff.

4.1.3.2. Conduct of Teff market

Market conduct refers to the patterns of behaviour that firms follow in adopting or adjusting to the markets in which they sell or buy. In other words, market conduct focuses on traders' behaviour with respect to various aspects of trading strategies such as buying, selling, transport, storage, information and financial strategy (Bain, 1968).

Purchasing and pricing strategy

The survey result indicated that, about 69.2 percent of traders attract their suppliers by showing their loyalty in providing fair and proper weighing and the rest 30.8 percent of trader attract their suppliers by giving better or reasonable price, but they attracted their buyers by giving quality product, fair scaling weighing and better price. Traders are taxed mainly based on the volume of the product they handled during the year and most of traders developed the experience to record the volume of the product transacted (bought, sold and price).

Table19. Trader's attraction method of suppliers and buyers

Attracting method	Frequency	Percent
giving better price	4	30.8
by visiting	--	--
fair scaling weighing	9	69.2
Total	13	100

Source: Own Survey result, 2019

The survey result revealed that, about 76.3 percent of purchasing price set by the market or demand and supply, and the rest 23.7 percent purchasing price is decided by the negotiation between traders and sellers of Teff. These figures indicated that, sampled traders considered supply and demand and nearby market prices information to determine the purchase and selling price of the market but sampled farmers being price takers. And also, all the surveyed traders sold their product on cash. None of them sold their product through combination of cash, advanced payment and credit.

The source of the working capital for majority of sampled traders is loan they offered from micro finance institution, but source of working capital for minority of them is their own. this shows that, in the study area, micro finance institution played a great role in equipping traders with finance that initiate them to create job not only for themselves but to the others also.

4.1.3.3. Performance of Teff market

Teff market performance is analyzed based on the level of marketing margins by taking into consideration associated marketing costs for key market participants. Hence, on the consideration of 2017/18 production year, costs and purchase prices of the main channel actors, margin at farmers, village assemblers, urban assemblers, road side traders and retailers level were conducted.

Cost and profitability analysis of Teff producer

This section of the study focused on activities related to producing Teff at farm level. Average costs and sales prices of the producers are used. This provides an insight about the performance of Teff market.

Table 20. Analysis of costs and profitability of Teff production in 2017/18

Cost items	Unit	Quantity	Unit price	% from total cost
Variable cost (VC)				
Price of Teff seed	Birr/Qt	0.5qt	1050	10.85
Land clearing and preparation	Man-day/ha	6	600	6.20
Drafting power(Oxen)	Timad/day	4	1000	10.34
Ploughing & sowing	Man-day/ha	9	900	9.31
Chemicals, fertilizer	Birr/qt	0.5qt	650	6.72
Weeding	Man-day/ha	2	350	3.62
Harvesting	Man-day/ha	23	2300	23.78
Threshing	Man-day/ha	17	1700	17.58
Transport from farm to home	Birr/qt	9qt	500	5.17
Marketing cost				
Broker's fee	Qt	---	--	--
Loading and unloading	Man-day/Qt	2	220	2.27
Transportation to market	Birr/Qt	9	330	3.41
Total VC	Birr/ha		9600	99.28
Fixed Cost (FC)				
Land tax	Birr/ha	1ha	70	0.72
TFC	Birr/ha		70	0.72
Total cost/ha(TVC+TFC)	Birr/ha		9670	100
Total Revenue/ha(PQ)	Birr		24300	--
Gross profit/ha(TR-TC)	Birr		14630	--

Source: Own Survey result, 2019

Average productivity of Teff and farm gate price for sampled farmer in the study area are 9 quintals per hectare and 2700 Birr per quintal. As table 19 shows, in production year of 2017/18, production of 9 quintals of Teff per hectare of land costs Birr 24,300, and a farmer earns a revenue of Birr 14,630. Variable costs that used to produce nine (9) quintals volume of Teff take

about 9600Birr/ha which covers 99.28 percent of the total cost. Particularly, the ploughing & sowing, threshing, and land clearing and preparation process are very tedious work for most sampled farmers because it is labour- intensive.

Cost and Profitability analysis of Teff traders

Analysis of cost and profitability of the different traders of Teff namely rural assemblers, urban assembler, wholesaler, retailers are analyzed across the markets. During analysis of cost and profitability, the average purchased price of a quintal of the Teff and the different average transaction costs associated with the marketing process of a single quintal until it reached the next actor are assessed.

Based on the result, average transaction costs incurred across different Teff actors varies. Accordingly, the total costs incurred by village assemblers, urban assemblers, wholesalers, and retailers of Teff are Birr 60, 139, 130, and 45 respectively. For village collectors/ assemblers, even though buying and selling of the Teff had taken place on their village market, they are exposed to different costs associated with marketing process, because, to sell the purchased Teff to another actors, they incurred many costs for example, for transportation, loading and unloading.

On the other hand, the data indicated that, the amounts of transaction costs per quintal of Teff incurred by retailers are Birr 45 which is the lowest cost of all traders. This was due to lower costs related to transportation, loading and unloading. Retailers usually purchased Teff from different actors in the middle of the market, road side and other places which are nearby to the market. Due to this, they are not exposed to different costs like transportation, and other costs. As a result, retailers exercised lowest average transaction costs per quintal than any other traders.

Additionally, the data indicated that, the amount of transaction costs per quintal of Teff incurred by Urban assemblers are Birr 139, which is the highest cost of all traders. This was to higher costs related to transportation, loading and unloading, and other costs. Urban assemblers usually purchase a volume of Teff, which they are not finishing selling in few days.

With respect to the profitability of Teff, the overall average profitability in different traders indicates that at every stage of transaction, Teff trading business is profitable. Table 21 revealed

that, retailers are traders who obtained the highest net profit per quintal that is due to the fact that, they were not exposed to different costs. Urban assemblers obtained least net profit per quintal due to high costs incurred in the marketing process.

Table21. Analysis of costs and profitability of Teff for traders, in 2017/18

Items	Village assembler	Urban assembler	Wholesaler	Retailer
Purchasing price	2550Br/qt	2700	2850	2700
Cost of loading-unloading	30	20	20	15
Commission to Brokers	---	4	5	--
Cost of transportation	30	50	40	--
Income Tax	--	15	15	--
Other costs	--	50	50	30
Total cost/quintal	2610	2839	2980	2745
Selling price	2700	2850	3000	3000
Gross profit	90	11	20	255

Source; Own computation of 2019

4.4.3.3. Marketing Margins

Marketing margin is a measure of the percentage of price paid by the consumer that is maintained by each agent in the marketing chain. These include the total gross marketing margin, producer's gross marketing margin, and net marketing margin. However, it may also describe price differences between other points in the marketing chain, for example, between producer and wholesale, or wholesale and retail prices. Therefore, for this section of the study, marketing margin is analyzed by considering the average sales prices of different participants in the Teff market channel and considering Margin and cost calculation for top four key Teff marketing channels.

Table22. Marketing margin for different marketing agents

Marketing channel	Purchase Price	Total Marketing	Sale Price	Gross marketing	% share of Margin	Gross profit	% share of profit

Participants	(Birr/qt)	cost		margin		margin (Birr/qt)	
Farmers	0.0	40	2100	450	40	153.5	40
Vill.assembler	2550	65	2400	23	2.04	23.08	2.04
Ur. assembler	2700	45	2550	135	12	79.92	12
Wholesaler	2850	25	2700	101	8.96	34.28	8.96
Retailer	2700	10	2700	417	37	101.76	37
Vertical Sum.	11,100	185	12,300	1112.71	100	392.54	100

Source; Own computation of 2019

4.2. Econometric result

In this study, those factors that affect market supply of Teff to the market are analyzed. Prior to fitting multiple linear regressions, all the hypothesized explanatory variables are checked for the existence of multicollinearity, omitted variable, heteroscedasticity and endogeinity problem.

Test of multicollinearity: The degree of multicollinearity among the explanatory variables has been tested using VIF for continuous variables and CC for dummy variables. The results for all VIF are ranging between 1.05 and 2.32 with mean VIF of 1.46. Therefore, Since VIF is less than 10; multicollinearity cannot be suspected and would not be a problem. For details see (Appendix Table1).

Contingency Coefficient: contingency coefficient carried out to check for the strength of relationship among discrete variables. The value ranges between zero and one, with zero indicating no association between the row and column variables and values close to one indicating a high degree of association between the variables. The decision criterion is that variables with contingency coefficient closer to one would be avoided from further consideration in the analysis. Since contingency coefficient is less than 0.75 which is 0.0072, therefore, there is no a high degree of association between the variables. For details see (Appendix Table1).

Omitted variable; the problem of omitted variable is tested using Ramsey RESET test. Since the p-value for this test is 0.9828 there is no omitted variable problem in this model.

Test of heteroscedasticity: if there is heteroscedasticity problem in the data set, the parameter estimates of the coefficients of the independent variables cannot be BLUE. Therefore, to overcome the problem, Robust OLS analysis with heteroscedasticity consistent covariance matrix is estimated. The problem of heteroskedasticity is tested using Breusch-Pagan / Cook-Weisberg test. Since the Prob > chi2 = 0.0003, therefore, there is heteroskedasticity problem in this model, But to overcome this problem, Robust OLS analysis is applied.

Among a total of 12 explanatory variables (8 continuous and 4 dummy) included into the econometric model four variables namely education level of farm household, Improved seed, number of oxen owned by farm households, and frequency of extension contact are found to be significantly influence market supply of Teff positively and one variable viz; distance nearest to the market is significantly influence market supply of Teff negatively (Table 23).

Table23. OLS results of factors affecting Teff market supply

Number of obs. = 121,	F(11, 109) = 51.32,	Prob. > F = 0.0000	
R-squared = 0.7795,	Root MSE = 1.7691		
	Robust		
Quantity Supplied	Coef.	Std. Err.	P>|t|
1. Price of other crop	-0. 003632	0.002929	0.218
2. Family Size	0.0758964	0.0820053	0.357
3. Nº of oxen owned	0.5375476	0.1939928	0.007***
4. Improved Seed	1.222979	0.4336419	0.006***
5. Dist. Nearest to market	-0.1491997	0.0760157	0.052*
6. Education Level	1.944036	0.3401812	0.000***
7. Freq. of Extension cont.	0.4336793	0.2093301	0.041**
8. Utilization of Credit	0.297679	0.3489208	0.395
9. Experience of Farm hh	0.006199	0.0328423	0.851
10. Off-farm Income	-0.5925609	0.3596178	0.102
11. Access to price Info	-0.3597831	0.3235917	0.269
_CONS	4.175346	1.340127	0.002***

****, ** and * are statistically significant at 1%, 5% and 10% probability level, respectively*

Source: own survey data (2019)

Mathematically the equation of the model is as follows:-

$$\text{QUANTSUP} = 4.175 + 0.54[\text{NUMOXEN}] + 1.22[\text{IMPSEED}] - 0.15[\text{DISTNEAR}] + 1.94[\text{EDULEV}] + 0.43[\text{FREQEXT}] + \varepsilon$$

F value is significant at 1 percent indicated that, there is at least one significant explanatory variable which affect the supply of Teff to the market from the model.

R Squared; The overall goodness of fit of the regression model is measured by the coefficient of determination R^2 lies between 0 and 1, the closer it is to 1, and the better is the fit. Hence, the R squared value of 0.7795, may be realized that, 77.95 percent of the variation is explained by the given independent variables. The remaining 22.05 percent of the variance is explained by other variables not included in this study. The F test: shows the Model is goodness of fitness because the Prob. > F = 0.0000

Improved seed (IMPSEED): This is a dummy variable and takes a value of 1 if a farmer uses improved seed and 0 otherwise. It is also found to influence the volume of Teff supplied at household level to the market positively and significantly at 5 percent significance level. The model result showed that, a one quintal increase in Teff yield resulted in 1.223 quintal increase in the volume of market supply of Teff keeping other factors constant. Improved seeds are associated with high productivity level and better capacity to resist diseases (Abay, 2007).

Education Level of Farm Households (Edu-HH): Education has showed positive effect on Teff quantity supplied to market with 1 percent of significance level. The survey results revealed that, if the education level increase by one year, the amount of Teff supplied to the market increases by 0.944 quintal, keeping other factors constant. This may be because majority of the farmers in the study area are at low level of education and thus unenable them to have better skills and better access to information to supply more Teff to market. Zekarias *et al.* (2012) indicated that, education positively affected the market supply of coffee.

Number of oxen owned (**OXEN**) - This variable has a positive effect on Teff supply to the market and found to be statistically significant at 1 percent significance level. If the number of oxen increases by one unit, the productivity of Teff increases by 0.537quintal, keeping other

factors constant. Similarly, study conducted Girma, 2015 indicated that number of oxen owned by the head of the household and expected to affects the marketable supply of Teff positively.

Distance Nearest to market: This variable has a negative effect on Teff supply to the market and found to be statistically significant at 10 percent significance level. The negative relationship indicates that the farther is a household from the Teff market, the more difficult and costly it would be to get involved in the Teff market. When the distance of the market (destination) is very farther from origin of the product, the marketing costs for example, transportation costs for their inputs and output is be higher. The result shows that, a one-kilometer increase in Teff market distance from the farm-gate reduces the quantity of Teff supplied to market by 0.149 quintal, keeping other variables constant. Similarly, study conducted by Efa 2016 indicated that, As the distance from the nearest market increases, variable transport costs increase and this discourages smallholder farmers from selling high volumes of teff.

Frequency of Extension Contact: Result of the finding indicated that, frequency of extension contact is positively and significantly related to the volume of Teff supplied to the market at 5 percent significance level. if the training like; technical advice, technological know-how (transferring new agricultural technologies and improving the farmer capacity for innovations), harvesting, spacing, compost preparation, post-harvest handling, storage and input use like chemical application, fertilizer application on different types of crop production, given to farmers by DAs at least once a month increases, the amount of Teff supplied to the market increases by 0.434 quintal, keeping other variables constant. The result of this study goes along with the findings of many authors, for instance, yishak (2005), and rahmeto (2007) found that access to extension service on improved maize seed, and improved haricot bean respectively affected marketable supply of each of the commodities significantly and positively.

4.3. Major Constraints and Opportunities in Teff production and Marketing

In order to increase production and productivity, the constraints and opportunities of the study area has to be studied, identified, prioritized, recorded and appropriate solution should be searched. For sake of clear understanding, problems/constraints are divided into production and marketing problems.

4.3.1. Production constraints

Technical problems:- the agronomic practices to cultivate Teff have little changed by farmers in the study area. Accordingly, overall Teff production in the study area largely relies on the traditional methods. For example, broadcasting which is a traditional method that slows improvement in Teff productivity commonly used for Teff sowing in the study area. It is observed that, the production and productivity of Teff is low, this is mainly because of lack of modern technology practices among farmers in the study area. Modern technology of Teff production namely: technique of seedlings, harvesting, spacing, post-harvest handling and storage, row planting, standard fertilizer application and other important technologies that increases production and productivity of Teff are not practiced, due to this they are unable to supply more volume of Teff yield to the market (Table 24).

Social preference for Teff color; White(Magna), and kuncho Teff are the preferred type which is the most expensive form of Teff, but less these types Teff cultivated by farmers in the study area. As a result, most of farmers in the Woreda produced other Teff colors rather than the preferred or improved Teff varities like that of Magna and Kuncho. So this lack of preferences for those improved Teff varities by the farmers is another production constraint that prevails in the study area (Table 24).

Poor knowledge of good agricultural practices: Lack of awareness on enhanced Teff farming practices, Lack of skills on range of planting methods (land preparation, row planting); preventing the emergence of increased pest and disease risks and post-harvest handling to reduce losses are the the major production challenges prevails in the study area.

Erratic rainfall patterns: The erratic rainfall distributions affected the production of Teff and other crops tremendously, because sometimes rain in the study area rains not at regular time. That means all or 100 percent the respondents revealed that, sometimes there is an unexpected rainfall prevailed in the study area. Rainfall starts late and ends early, other time's rain stops at the booting stage, where water is important decrease production and productivity of Teff. Heavy rain is also affect Teff production, because Teff is intolerant to excessive rainfall.

Road and transport: table 24 below depicted that, 85.12 percent of farmers or sampled respondents faces the problem of poor road and there is a traditional transporting means such as

donkeys in the study area. Even though there is an improvement on road access in the country, still there is a problem of road and transportation in the Woreda. Due to this, transporting inputs from sources to farm gate and outputs from farm to selling sites are very difficult. There is an also motor bike in the Woredas which charges high transportation cost that hurts farmers' income of selling of outputs and buying of inputs while transporting agricultural inputs and outputs.

Extension support problems:- as indicated below in the table 24, 76.03 percent of farmers in the study area are not get extension training on agricultural crop production because, there is no sufficient numbers and well trained Development Agents deployed in each Kebeles to give effective extension service to the farmers. New agricultural technologies is influenced by the efficiency of communication between the Development (change) Agents(DAs) and the farmers at grass roots level. For this fact, farmers of the study area lacked the important means of transferring new agricultural technologies and improving their capacity for innovations.

Labour-intensive nature of Teff production: as indicated in table 24 below, 100 percent sampled respondents faces the difficulty in Teff production like land preparation, cultivating, row planting, and harvesting because of labour- intensive nature of the Teff production.

4.3.2. Marketing constraints

In addition to production constraints, Teff marketing is constrained by different factors. The most prominent ones are the following:

Market research and information: With respect to access to market/price information there is no system in place for systematically collecting, analyzing and disseminating information relevant to the needs of different actors**.** As a result, there are no organized market information system to support farmers in the study area. However, 97.5 percent of farmers obtained information on the local market from their neighbors and other farmers. And also, there are inadequate availability of market research resulted in uninformed planting and marketing decisions. Hence policy makers should target to solve these problems in developing policies and programs.

Poor market orientation of farmers: table 24 depicted that, 92.6 percent of Farmers used to sell their crop immediately after harvest without seeking to make the best possible profit (at the best time or the best price) this is due to liquidity constraints.

High marketing costs: as indicated in the table below, 82.6 percent of the sampled resondents revealed that, poor conditions of roads and the lack of access to means of transportation, is costly and time-consuming for them to market their produce in the study area.

Dynamic marketing price and lack of up to date market information for producers: this is an important marketing constraint. It is observed that, 68.6 percent farmers or sampled respondents in the study area lack a reasonable price and up to date market information for their produces which particularly affects supply products (Table 24).

Table 24 Production and marketing problems of farmers

Problems	N(freq,) 121	Percent
market information	83	68.6
High marketing costs	100	82.6
market orientation	112	92.6
Market research and information	118	97.5
Labour-intensive nature of Teff production	121	100
Extension support	92	76.03
Road and transport	103	85.12
Erratic rainfall patterns	121	100
Poor knowledge of good agricultural practices	63	52.07
Social preference for Teff color	57	47.1
Technical problems	59	48.8

Source own survey result 2019

4.4. Opportunities for Teff production and marketing

The opportunities of the study area are; availability of good weather condition, fertile land, motivated and hardworking farmers, the presence of suitable soil and agro-ecology for Teff

production and location of the Woreda for agricultural marketing's (very near to two Woredas' markets). And also, it is observed that, there is fast-growing demand for Teff by low and middle income consumers.

Availability of good weather condition; the climatic condition of the woreda is characterized as Woina Dega climatic Zone which very important for growing of Teff. The area receives a bimodal rainfall where the high rains are between August to October and the small rains are from February to April. However, during the main rains, all crops grown in the area are planted including maize, Teff, wheat, sorghum.

The other opportunity the area possess is the presence of suitable soil and agro-ecology for Teff production; The soils of the area are believed to be a relatively fertile and during good rains farmers can harvest good yield even without fertilizer application.

Government suitable agricultural policies designed to support farmers at the grass -root level is the other opportunity dimension. Administrative decentralization and the deployment of development agents at each PAs based on their academic background are also important policy dimensions. Furthermore, provision of infrastructure facilities like roads, telecommunication is very important.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusion

The study is conducted in Adola Rede Woreda located about 485 km in South of Addis Ababa. The area is known for its surplus production of agricultural commodities. However, analysis of market chain of agricultural crops in general and Teff in particular are not well understood. The study attempted to investigate marketing chain of Teff in the area. Selection of this crop is mainly based on its relative importance and marketability.

The study is conducted in order to identify major problems and opportunity of Teff production and marketing, analyze structure-conduct-performance of the market, and identify determinants of supply of Teff in the area. The production and marketing constraints that encounter farmers are poor knowledge of good agricultural practices, erratic rainfall patterns, poor road and transport, extension support problems, labor-intensive nature of Teff production, high marketing costs, marketing price and lack of up to date market information for producers, and lack of market research and information.

Traders of Teff in the Woreda have the problem of capital shortage, information flow, and absence of storage. Accordingly, the opportunities of the study area are availability of good weather condition, availability of fertile land, availability of motivated and hardworking farmers, and the presence of suitable soil and agro-ecology for Teff production.

Following Teff, the production of Maize, wheat and Barley are the main source of cash for farmers in the study area with the average land allocated; 0.78, 1.07, 0.67, and 0.34 hectares respectively. The minimum and maximum land allocated by sampled respondents to the production of Teff was 0.5 and 1.5 hectares respectively.

In the study area, of the total volume of Teff produced, 97.3 percent of Teff are supplied to the market. During the survey, it is observed that the average amounts of Teff marketed per household head are 10.25 quintals. Teff producing sample respondents in the study area, used 100 percent DAP fertilizer rate ranging from 50kg to 100kg per hectare, which is related with a proper application of the recommended fertilizer rate to obtain the required production and

productivity. In the study area, 38.8 percent of Teff producing sampled respondents are used DAP 50 kg/ha, whereas, the rest 61.11 percent were used DAP 100 kg/ha.

Trading in livestock or livestock product, Daily worker (labourer), Sales of charcoal, oxen fattening, and petty trade (small shops) are found to be some of the off/non-farm income generating activities in which sampled farmers are participating in the study area. From sampled households, about 18.75 percent were participating on off/non-farm income activities because of shortage of land, and attractive income from off-farm activities and 81.25 percent are not participating on off/non-farm income activities.

The result of this study shows that, 43.18 percent of the sampled respondents owned transportations like; motor bike, pack animal, and animal pulled cart whereas majority of them, which is about 56.82 percent of the sampled respondents hadn't the transportation. Sampled Teff producing farmers reported that they have to travel an average of 9 km (approximately) to sell their product to the nearest market.

Farmers in the study area undertake both crop and livestock production activities. Though livestock holding size varied among the sample farmers, livestock are kept for various economic and social reasons in the study area. The major economic reasons include generation of cash income, food and animal dung (as an organic fertilizer and fuel). Important animals kept by the sample farmers are oxen, cows, heifers, and donkey. Oxen are the main source of farm power for ploughing, harrowing, and threshing. About 54.86 percent of the total respondents owned oxen. The sample respondents on average have a pair of oxen 2.11. Additionally, about 61.11 percent of the total respondents owned cows.

The only major source of credit in the study area is Oromia Savings and Credit institutions (OSC). Respondents reasoned out that, 52.08 percent of them are not took credit due to high interest rate, and availability of other alternatives. According to the sampled farm households; Land holding, membership, partial payment, collateral and personal guarantee are the preconditions to get credit in the study area. In taking formal credit, most of sampled respondents perceived problems such as restrictive procedures, group lending system and high interest rates.

There were no organized market information systems to support farmers in the study area. About 43.9 percent of the sampled farmers had access to market information from different sources whereas 56.1 percent are not access to market information. About 20.14 percent producers obtained market information from the nearby market, none of the Teff producers obtained price information from the central market before selling the produce. The sampled respondents revealed that, the major source of market information in the study area are Other Teff farmers.

The comparison made among the channels with respect to the volume of Teff that is transacted through each channel shows that the farmers-collectors-wholesalers-processors-consumers channel is the channel in which the largest volume (i.e. 253qt) of Teff was transacted. This comprises about 22.06 percent of the total volume of Teff transacted. This is followed by farmers-wholesalers-retailers-consumers channel in which a total volume of 211quintals of Teff is transacted. This amounts to about 18.8 percent of the total amount marketed. In contrast, the farmer/producer-consumer channel is the one that accounts for only 5.5 percent of the total volume of Teff transacted in the chain.

Among a total of 12 explanatory variables (8 continuous and 4 dummy) included into the econometric model four variables are found to be significantly influence market supply of Teff positively and only one variable is found to be significantly influence market supply of Teff negatively.

5.2. Recommendation and Policy Implication

In accordance with the analysis made, problems faced in production and marketing of Teff, generally, the following points are recommended to develop sustainable marketing system of teff that is locally adaptable and acceptable to increase the competitiveness of smallholder farmers:

- The result confirms that education improves the readiness of the Teff producing households to accept new idea and innovations as well as get updated demand and supply price information which in turn enhances their willingness to produce more and also supply more to market. Therefore, government and other concerning bodies should give emphasis on encouraging farmers to learn adult education and providing short and intermediate practical based training, improvement of existing road facilities.

- There are inadequate availability of market research resulted in uninformed planting and marketing decisions. Hence policy makers should target to solve these problems in developing policies and programs.
- Even though, the Government assigned two DAs in each Kebeles', to give effective extension service to the farmers, the services they gave to farmers are much the expected level. Supervision, control and other important enforcement should be made by government. And again, Efforts should be made to strength the linkage between Development (change) Agent and the farmers. As a result, the product and productivity of the crops is increase which is further improves marketing chains of Teff in the study area. Hence, it is recommended to assign efficient extension system, updating the extension agent's knowledge and skills with improved production and marketing system. In short, the farmer-extension-research linkages need to be strengthened.

- Farmers who live far from the market without their own means of transportation are unlikely to sell to private traders and cooperative, suggesting the importance of adequate road facilities and transportation services in providing options for marketing agricultural produce. Since most private traders have transport constraint, they are likely to operate in areas in which the road facilities is good and in the area where transport services are available. Hence, households tend to minimize transaction costs by selling to rural collector and other informal traders who typically offer door-to-door services at unfair prices. Therefore, this study recommends that an improvement of existing road facilities would reduce the time spent to reach the market and lower transportation costs would enhance farmers to sell their produce that results higher returns.

- The result of the regression analysis showed that, Teff production had a significant influence in the supply of Teff. Hence, there should be supply of improved seed at a reasonable price to improve farmers' efficiency in the production of Teff and other crops.

- Having more number of oxen by farmers are important to increase their production and productivity Teff and other agricultural crops.

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7. APPENDIX

Appendix Table1 Multi-co linearity test result for continuous variables

Variable	VIF	1/VIF
Number of Oxen Owned	2.03	0.49
Distance Nearest to Market	1.76	0.57
Frequency of Extension Contact	1.36	0.734
Price of Other crops	1.15	0.87
Nonfarm Income	1.13	0.887
Experience of HH	1.08	0.923
Family Size	1.05	0.95
Mean VIF	1.46	

Source**:** own survey result, 2018

Appendix Table 2. The existence of omitted variables (checked)

Ramsey RESET test using powers of the fitted values of QSUPPLY

Ho: model has no omitted variables

F(3, 106) = 0.06

Prob > F = 0.9828

Appendix Table3. Contingency coefficient of dummy variables

	Improved seed	Education Level	Utilization of Credit	Access to market information	Membership
Improved seed	1.0000				
Education Level	0.2520	1.0000			
Utilization of Credit	0.1694	0.4805	1.0000		
Access to market information	0.0333	0.1207	0.1940	1.0000	
Membership	.	.	.	.	.

Source: own survey results of, 2019.

Appendix Table4. OLS results of factor affecting supply of Teff to market.

Number of obs. = 121,	F(11, 109) = 51.32,	Prob. > F = 0.0000
R-squared = 0.7795,	Root MSE = 1.7691	
	Robust	
Quantity Supplied	Coef.	Std. Err.	P>|t|
Price of other crop	-0. 003632	0.002929	0.218
Family Size	0.0758964	0.0820053	0.357
Nº of oxen owned	0.5375476	0.1939928	0.007***
Improved Seed	1.222979	0.4336419	0.006***
Dist. Nearest to market	-0.1491997	0.0760157	0.052*
Education Level	1.944036	0.3401812	0.000***
Freq. of Extension cont.	0.4336793	0.2093301	0.041**
Utilization of Credit	0.297679	0.3489208	0.395
Experience of Farm hh	0.006199	0.0328423	0.851
Off-farm Income	-0.5925609	0.3596178	0.102
Access to price Info	-0.3597831	0.3235917	0.269
Cooperatives	0	(omitted)	
_CONS	4.175346	1.340127	0.002

Source: own survey results of, 2019.

Appendix Table6.Conversion factor for adult equivalent Age group (years) Adult equivalent

Age group(years)		Adult equivalent
	Male	Female
<10	0.0	0.0
11-13	0.9	0.8
14-16	1	0.75
17-50	1	0.75
>50	1	0.7

Source: Storck *et al.*, 1991

APPENDIX

DILLA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF AGRICULTURAL ECONOMICS

Household level survey questionnaires

This questionnaire is designed to investigate **"Market Chain Analysis of Teff production" The Case of Adola Rede Woreda, Guji Zone** and will serve as a major input for the master thesis research being conducted in pursuit of purely academic purpose. The response given by the respondents will be used only as an input for the research work. Hence, the respondent is kindly requested to provide us his/her genuine responses to the sets of questions included herewith in the questionnaire. In addition, the researcher would like to be grateful to the respondents the sacrifices they paid in completing this questionnaire.

Thank you in advance for your cooperation!

1. General Information

a) Questionnaire number: _____

b) Name of the enumerator: _____Signature:_____

c) Date: _____/ _____/_____

d) Name of Kebele _____

e) Name of the village _____

2. Household Characteristics

1. Name of household head _____

2. Sex of household head; 1= Male 0= Female

3. Age of household head _____years

4. Education level of household head literate=1; Otherwise=0

5. Marital status of the household head; 1. Single 2. Married 3. Divorced 4. Widows

6. Family size _____

3. Production

7. Total land holding owned _____ (ha)

a) Total land hired in _____ (ha) c) Land allotted for *Teff* _____ (ha)

b) Cultivated area _____ (ha) d) land rented out_____ (ha)

8. What is the rental value of one 'timad' of land? _____ Birr for ____ year(s)

9. Production of *Teff* and major crops in 2010.E.C

	Type of crop	Quantity prod.	Qty consumed	Quantity sold	Price in 2018/100kg
1.	Teff				
2.	Wheat				
3.	Maize				

4. Others

10. The best cash crops relative to level of income 1st _____2nd _____ 3rd _____

11. Which type of *Teff* Variety are you using? a. Local b. Improved c . Both

12. Amount of *Teff* you produced in 2010 E.C? _____(quintal)

13. Is labor force available for production of *Teff*? a. Yes=1 b. No=0

14. What is your source of labor for *Teff* production? a. Family labor b. "debo" c. Hired labor d. All

15. Have you used fertilizer in production year of 2010E.c? 1. Yes 2. No

16. If q#15 is "Yes" DAP ____kg price____ Birr/50kg, UREA _____Kg price ___Birr/50kg

3. Source of Income

1. What are your major sources of income?

a) Sale of crops c) Off-farm income

b) Sale of livestock and/or products d) Others (specify) _____

2. Estimate of annual cash income from

A. Sale of livestock products (milk, butter, egg,) ___Birr/year B. Other sources _Birr /year

3. Do you have any other sources of income from off farm activities? Yes/No

No	Off farm activity	Total income per year
1	Sales of wood	
2	Sales of charcoal	
3	Sales of sand	
4	Daily worker (labourer)	
5	Shop	
6	Trading in food crops	
7	Trading in livestock or livestock product	
8	Land rent	
9	Oxen rent	
10	Donkey/horse rent	
11	Other specify	

4. What is the reason behind you or your family members to be engaged in non-farm activities? 1. Shortage of land; 2. Excess family labor; 3. Attractive income from off-farm activities; 4.other, specify___

4. Credit services

1. Have you received formal credit in 2010 E.C? 1. Yes =1 2. No=0

2. If your answer to **Q#1** is "No", what will the main reason?

a) Lack of Access c) Lack of Collateral

b) High interest d)Availability of other alternatives

e) No need f) inability to repay g) other (please specify)_____

3. If yes, how much did you take? _____

4. If your answer to **Q#1** is "yes", how much did you borrow? _____.

5. If your answer to **Q#1** is "yes", what will your **major source**?

A. Savings and credit institutions C. Commercial banks

B. Informal creditors D. Local money Lender

E . Micro finance F. NGO G . Other; Specify _____

6. If your answer to **Q#1** is "yes", For what purpose you used?

A. Purchased Inputs such as fertilizer, improved seeds, etc C. Rented-in land

B. Purchased Livestock D. Hired farm laborer

E. other (please specify) _____

7. What will the precondition to get credit?

A. Membership C. Land holding E. Collateral

B. Personal guarantee D. Partial payment F. Others (Specify)_____

8. What problem do you perceive in taking formal credit?

A. Inadequacy of supply C. Restrictive procedures

B. High interest rates D. Others (specify) _____

9. Have you been able to settle all or part of your loan?

A. Yes, paid out all B. Yes, paid out partially B. No, not paid at all

10. How do you assess the cost of getting credit (interest and other charges)?

A. Expensive B. Affordable C. Cheap

5. Extension Services

1. Did you have an extension access in 2010? 1. Yes =1 2. No=0

2. If yes, how often the extension agent contacted you specifically for *Teff* production and marketing purpose? Per month on average _____

3. What type of extension service did you get? 1=Yes,0=No

A. Technical advice 1. Yes 2. No

B. Price information 1 Yes 2. No

C. Input use 1. Yes 2. No

D. Credit use-making 1. Yes 2. No 5. Other _____

6. Marketing Aspect

1. Did you sell *Teff* in 2010? 1. Yes=0 2. No=0

2. If Q #1 is 'yes', which type of *Teff* you sold? 1. Improved 2. Local 3. Both

3. Total quantity sold and average selling price (2010 E.C).

Teff Type	Total Quantity sold	Average selling price
Improved		
Local		

4. To whom did you sell? (multiple answer is possible)

A. Local collectors D . commission agents G . Consumers G.Informal traders

B. Wholesalers E. Urban H . collectors

C. Retailers F. speculators I. Millers/processors

5. Reason for selling to the selected actor?

A . Price difference from others C. Transport availability

B. Closeness in distance D. Others (specify)_____

6. For how many months you store *Teff* for sale (on average) _____(years)
7. Did you know the market prices before you sold *Teff* in 2010E.C? 1. Yes=1 2. no =0
8. Did you know the nearby market price before you sold your *Teff*? 1. Yes=1 2. No=0
9. Who set price in the market? 1. Myself 2. Set by market 3. Buyers 4.Other_____
10. Do you have access to market information? 1. Yes =1 2. No =0
11. From which source did you get information on supply of *Teff* markets?

    1. Other *Teff* farmers 2. Personal observation 3. Radio 4. Broker 5. TV 6. Telephone 7. Extension agents 8. Other_____

12. What do you think about last year price? 1. High=1 2. Otherwise=0
13. Where do you sale/market place?

    1. within village 2. Outside the village 3. Within Woreda 4.Outside Woreda

14. Is there a difference in price due to differences in place of sale and the type of buyer? Yes/No
15. How many kilometers you need to travel to get

    A. The nearest market for selling *Teff* _ Km (walking minutes) B. The Woreda market _ Km

16. If you store, how did you store *Teff*?

    A. Staying the unthrashed with straw (Kimr) C. In store/"gotera'
    B. Filling in sack and placing in 'house set' D. Other (specify) ____

17. If you stored, what will the motive/main reasons behind to store?

    A. Expecting high price C. Lack of market demand
    B. Saving purpose D. other (specify)_____

18. Do you have your own transportation means equines (donkey, horse, and mule)? Yes/No
19. Do you have ox/en? 1. Yes =1 2. No=0
20. If your answer for Q#19 is 'Yes' how many oxen did you have in 2010E.C? _____
21. For what purpose you used the rest oxen? _____

Questionnaire for traders

General Characteristics

Questionnaire number: _____

Name of enumerator: _____ Signature_____

1. Date: _____/_____/_____
2. Town/market/village where business is located_____
3. Name of the respondent _____
4. Age of traders_____
5. Gender A. Male B. Female
6. Level of education of respondent (formal years of schooling) _____
7. Marital status A. Married B . Single C . Divorced D . Widowed
8. Family size 1. Female_____2. Male_____

9. Main Occupation:

A . Wholesaler C Processor E.Urban assembler

B. Retailer D . Farmer trader (village collector) F .Others (specify) _____

10. For how long have you been operating in this business? _____years

11. Position of respondent on the business:

A . Owner C . Employed manager

B. Spouse of owner D . Relative of business owner E. Others (Specify) _____

12. When did you do your business in 2010E.C?

A. Year round B. When purchasing price low (high supply) C. Other (specify)_____

13. Do you practice trading other than *Teff*? 1= Yes 0=No

14. Number of market days in a week? _____

15. What will the amount of your initial working capital when you start this *Teff* trade business? __Birr.

16. What is the amount of your current working capital in 2010E.c? _____Birr.

17. What is your source of working capital? A . Own B . Loan C . Gift D . Share E .Others (specify) ____

18. If it will loan, from whom did you borrow? A. Relative/family B. Other traders C . Private money lenders. D . Micro finance institution. E . NGO. F . Bank. G . Friends. H . Others (specify) ------

19. How much will the rate of interest? _____ Birr for formal, ---------- for informal.

20. How will the repayment schedule? A . Monthly B . Quarterly C . Semi-annually D . When you get money E . Others (specify) _____

21. Who will buy *Teff* from you in 2010? A . Wholesaler B . Retailers C . Household consumers D . Brokers E . Processors F . Others (specify) ____

22. From where did you purchase *Teff* in 2010E.c?

A. From village, name of village (specify) B. From market, name of market (specify)------

23. How did you sale your produce in 2010E.c?

A. Direct to the purchaser B. Through broker C. Other (specify) ----------

24. Who sets the price in 2010E.c? A. Myself B. Set by market C. Buyers D. Other ----

25. How did you set price? A. Set at time of advance given B. Negotiated at delivery C. At time of delivery D. Others_____

26. If purchasing price will set at the time of advance given, how did you agree? A. Orally

B. Written agreement C. Other (specify) _____

27. What do you do, if the product is not sold on time? A. Took back home B. Took to another market C. Sold it at lower price D. Sold on other market day

28. How do you attract suppliers? A. Giving better price B. By visiting those C. Fair weighing D. Other (specify)_____

29. Who purchase *Teff* for you in 2010E.c? A. Myself B. Broker C. Commission agent

D. Family members E. Friends F. Others____

2. Buying practices

1. What products do you purchase in your trading center? 1. *Teff* only 2. *Teff* and sorghum

3. Pulse crops (specify

4. Other cereal crops (specify

2.If you are involved in more than single commodity trade which one is larger in volume?

A. *Teff* *B* . Sorghum C . Other cereals (specify)_____

3. Who are the major suppliers of *Teff* to you? A. Farmers B . Retailers C . Brokers D . Other wholesalers E . Others (specify)_____

4. If farmers are the major suppliers, where does the transaction takes place? A. Farm gate B . Farmers bring their products up to our business center C . Market place

5. If they bring products up to your trading Centre, do you help them in terms of transportation? 1. Yes =1 2. No=0

6. If yes how do you help them? A. Share part transportation cost B . Send for them track C .Cover the whole cost of transportation 4. Others (Specify) _____

7. Do you have any arrangement with *Teff* suppliers? 1. Yes=1 2. No=0

8. If yes, what kind of arrangement you practiced? 1. Contract with producers 2. Contact with local traders 3. Other/specify _____

10. Do you have your own intermediaries who collect Teff from farmers? 1. Yes=1 2. No=0

11. If no, how do you access the produce from farmers? _____

12. From which market you bought *Teff* in 2010E.c? 1. Village market 2. Woreda market

3. Other Woreda market 4. Zonal market 5. Other (specify) _____

13. Average quantity purchased in a year _____

14. Average monthly price per 100 Kg of *Teff* _____

15. How many days did you operate in marketing of *Teff* in a month _____?

17. Did you use brokers to purchase Teff? 1. Yes=1 2. No =0

18. If brokers were used, what will the advantage of using brokers? 1. You could get buyers and sellers easily

2. Reduce transaction costs 3. Purchased at lower price 4. Sell at higher price 5. Other (specify) _____

19. Is there any problem related with using brokers? 1. Yes =1 2. No =0

20. If there is problem, what problems did they create? A . Cheating quality B. Wrong price information C. Cheating scaling (weighing) D . Charged high brokerage E. Other (specify)_____

21. How do you measure your purchase? A. by standard weighing (kg) B . By traditional weighing materials C . Other (specify) _____

25. Average cost of transportation you incur to transport 100 kg of *Teff*:

A. From purchase, center /collection point to the store? _____Birr/100 kg

B. From store to market? _____ Birr/100 kg

26. How much will the loading and unloading expenses per 100 kg? _____

3. Selling practices

1. To which market and to whom did you sell *Teff* in 2010E.C

2. How did you attract your buyers? A . By giving better price relative to others B. By visiting those C. By fair scaling (weighing) D . Others (specify)

3. How many regular buyers do you have in 2010? _____ A _____Wholesalers_____ B.Consumers_____ C . Processors D . Assembler E . Retailers'_____ E. Others (specify) _____

4. Do you know the market prices in different markets (on farm, village, Woreda) before you sold your *Teff* in 2010E.C? 1=Yes 0= No

5. What is your source of information? _____

6. How do you qualify the reliability, timeliness and adequacy of the information you got? Regarding the nearby local and Woreda market. A . It will reliable B. It will timely C . It will adequate D . Others (specify) ----------

6. Are you willing to pay for market information if it is available? 1= Yes 0= No

7. Accessibility to market roads in rainy seasons for vehicles is 1. Difficult 2. Easily accessible

8. If difficult, for how long? _____Months

9. Who is the price maker in the *Teff* market? ----------

10. Factors affecting the price of products and services in the area----------

11. Do you usually have any legally binding contract agreement with your suppliers and buyers? 1. Yes=1 2.No=0

12. If yes, is there any problem with enforcement of contracts? 1. Yes =1 2. .No=0

13. Which market regulations affect your business? _____

4. Marketing Services

1. Did you pay tax for *Teff* you purchased in 20109? 1=Yes 0=No

2. Did you pay tax for *Teff* you sold in 2010? 1=Yes 0=No

4. What will the basis of tax for *Teff* you sold in 2010? 1. per 100kg _____Birr 2. Fixed payment _____ Birr 3 . Other (specify) _____

5. What is your opinion regarding the marketing fee paid in this market as compared to your transaction?

A. Low B . High C .Average D . I don't know

6. Is Teff trading in your locality needs a trading license? 1=Yes 0=No

7. If yes, how do you see the procedure to get the license? 1. Complicated 2.Easy

8. Did you have Teff trade license? 1=Yes 0= No

9. How much did you pay for *Teff* trade license for the beginning? _____Birr

11. Did you store *Teff* before you sold in 2010? 1= Yes 0= No

12. If yes in Q #11 for how long did you store *Teff* in the store? Maximum for_____months.

6. *Teff* market related problems

13. Can you mention the marketing agents who are causing problem in the *Teff* market ?

14. If you have any recommendation or advice in order to improve marketing of *Teff* in the area

Checklist for Key Informants Interview

I. Personal background

1.Name of the organization: _____Types_____

2.Role of the interviewee in the organization:_____

3.Location and contract information: Region/Zone/Woreda/Kebele/_____

4.Organization mission, vision and objectives_____

5.What is your job responsibility?_____

6.How long have you served in this Woreda and in what capacity?_____

II. Production, Marketing, and Farm Characteristics

1. What is the primary means of livelihoods for the people in this Woreda?_____

2.What are the main food and cash crops grown in this Woreda/ why?_____

3.What services and assistance do the farmers get from your office?_____

4.What efforts are done to integrate the smallholder farmers with the market?_____

5. What are the challenges and opportunities at their disposal?_____

6.What are the major non-farm activities farmers in your Woreda mainly engaged in?_____

7.How many hectare of land is potentially suitable for production of *Teff* in your Woreda?_____

8.What portion of land is allocated for the production of *Teff* currently?_____

9.Who is the primary buyer of the commodity from the farmers?_____

10. Are there any marketing cooperatives in this Woreda?_____

11. If so, is *Teff* product traded through these cooperatives?_____

12. What is the role of your organization in strengthen Teff market chain in the study area?_____

13. What are the challenges and opportunities you faced in undertaking those roles assigned to your organization?_____

14. What problem did think all actor of Teff market chain facing?_____