Analysis of Onion Value Chain in Sebata Hawas, Special *Woreda* Zone of Oromia Surrounding Finfinne, Ethiopia

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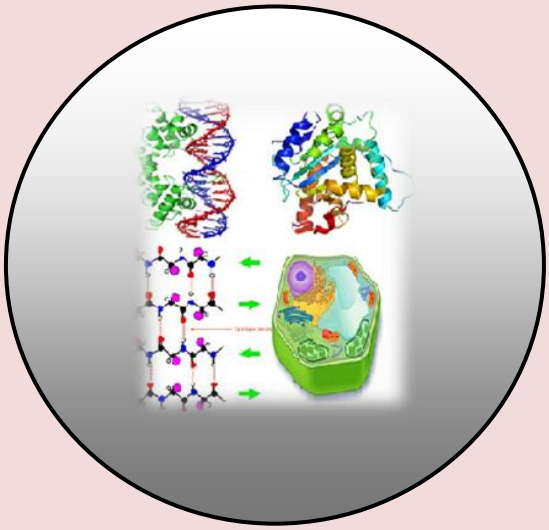
ISSN 2319-3077 Online/Electronic
ISSN 0970-4973 Print

Index Copernicus International Value
IC Value of Journal 82.43 Poland, Europe (2016)
Journal Impact Factor: 4.275
Global Impact factor of Journal: 0.876
Scientific Journals Impact Factor: 3.285
InfoBase Impact Factor: 3.66

J. Biol. Chem. Research
Volume 38 (1), 2021 Pages No. 53-89



Journal of Biological and Chemical Research

An International Peer Reviewed / Referred Journal of Life Sciences and Chemistry

Indexed, Abstracted and Cited in various International and National Scientific Databases

Published by Society for Advancement of Sciences®

J. Biol. Chem. Research. Vol. 38, No. 1, 53-89, 2021
(An International Peer Reviewed / Refereed Journal of Life Sciences and Chemistry)
Ms 37/02/7680/2020

ISSN 2319-3077 (Online/Electronic)
ISSN 0970-4973 (Print)

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RESEARCH PAPER

Received: 20/11/2020 Revised: 15/01/2021 Accepted: 16/01/2021

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ABSTRACT

The specific objectives of the study are to identify onion value chain actors, supporters and their roles, to analyze benefit share of actor and to analyze the determinants of quantity of onion supplied to the market in the study area. Primary and secondary data sources were used. The primary data were collected from 245 randomly selected households in the study area from April to May 2017. Primary data were also collected from traders such as 32 assemblers, 20 brokers, 20 retailers and 10 wholesalers, which were randomly selected. Moreover, 10 processors of pulses and bebere and 20 consumers from Sebeta were interviewed. Focus group discussions were held with 10 key informants from 6 different institutions of value chain supporters and influencers. Both descriptive statistics and econometric analysis were used to analyze the data using STATA version 13. About 78.78 % of the respondents indicated that farming is their only source of income. Onion producing farmers incur production cost of 237 birr per quintal. The estimated volume of production of onion was about 16,895 quintals of which about 16,648 quintals of onion was sold. The study identified five onion marketing channels. Out of the channels producers, collectors, wholesalers, retailers and consumers channel was the most dominant one. About 13,486 quintals of onion (81 %) was supplied through this channel. The survey indicated that producers get higher profit, which was birr 58.60 per quintal followed by wholesalers which earned 49.50 birr per quintal. Retailers and assemblers earned 49.04 and 32.19 birr per quintal respectively. After the appropriate specification tests, to solve heteroscedasticity problem, the Robust regression model was run and analyzed using ten explanatory variables and the result showed that five explanatory variables (Sex, age, quantity of onion produced, access to irrigation and access to own transportation) were found to significantly determine the variability in the households' marketed surplus at 1 % and 10 % significance level. The multiple linear model was statistically significant at 1 % and 10 % probability level indicating the goodness of fit of the model to explain the relationships of the hypothesized variables. Coefficient of multiple determinations (R^2) and were used to check goodness of fit for the regression model. Hence, R^2 and Ovtest indicate that 99.97 % and 78.22 % of the variation in the quantity of onion supplied to market was explained by the variables included in the model respectively.

Key words: Onion, Value chain, Benefit share and Multiple Liner Regression Model Oromia.

INTRODUCTION

Background of the Study

The Ethiopian rural development policy and strategy document has given attention to follow diversification in production systems, as one of the strategies to ensure households food security. In most irrigable lands, horticultural crops in general and vegetables in particular, play an important role in contributing to the household food security. Higher profits can be achieved by increasing the production of vegetable throughout the year when efficient irrigation system is used (Rehima and Dawit, 2012).

The production of vegetable offers opportunities for poverty alleviation, because it is usually more labor intensive than the production of staple food crops. Hence, the generation of additional employment opportunity in rural areas.

Onion is valued for its distinct pungency or mild flavor and form of essential ingredients of many dishes. It is consumed universally in small quantities and used in many homes almost daily, primarily as a seasoning for flavoring of dishes, sauces, soup, and sandwiches in many countries of the world. Onion also contains Vitamin B, Vitamin C, carbohydrate and small percent of proteins (Lemma et al., 2004).

According to CSA (2012), about 2,710 million tons of vegetables and root and tubers were produced on 541,000 ha, creating means of livelihood for more than 1 million households in 2010/11 in Ethiopia. Vegetable crops of economic importance that are largely produced in Ethiopia include pepper, kale (Ethiopian cabbage), onion, tomato, pepper, chilies, carrot, garlic and cabbages. Green beans and peas, okra, asparagus, cauliflower, broccoli, celery, eggplant, paprika and cucumbers have recently emerged as important export vegetables (Ethiopian Investment Agency, 2012). Recently crops like green peas, okra, celery and eggplant are also becoming important for private companies for the export market (Emana et al., 2014).

Onion is one of the most important ingredients in the Ethiopian kitchen and used especially during fasting times, when the people who fast only eat vegetarian food. Onion (*Allium cepa L. var. cepa*) is an important vegetable crop worldwide and is ranked second among all vegetables in economic importance. In Ethiopia, the crop is one of the most important vegetables produced by smallholder farmers mainly as a source of cash income and for flavoring the local stew 'wot' (Lemma and Shemelis, 2003). In Ethiopia, the crop is believed to be more regularly consumed than any other vegetable crop. In Ethiopia, the crop is one of the most important vegetables produced by smallholder farmers mainly as a source of cash income and for flavoring the local stew 'wot' (Daneils and Fors, 2015). In Ethiopia, the crop is believed to be more intensively consumed than any other vegetable crop. A lion's share (i.e. 95 %) of the vegetables and fruits produced in the country comes from the smallholder sector (Bekele et al., 2011). The onion export in the form of bulbs and cut flowers have contributed to Ethiopian economy by generating export earnings. The average annual sales of dry bulb and cut flowers by the Ethiopian Fruit Enterprise alone was estimated to be about 6.2 million birr (ETFRUIT, 2005). According to World Bank report (2014), in the year 2011 the crop shared one fourth of the vegetable export quantities and stood third, following green beans and peas contributing about 20% of the total vegetable export value which is about 244,000 US dollar of export earnings. In addition to dry bulb, onion cut flower also constitutes significant proportion of foreign export values. Another way of intervention is to identify good standing cooperatives or associations and help them to capacitate themselves to engage in business enterprising activities that will tend to promote the onion industry in the province. To attain the foregoing objectives, the disterct aspires to establish in each of an organic fertilizer processing facility run and managed by an empowered and capable farmers' group at the disterctl level. It also aims at promoting onion production technology in the aforementioned municipalities. In alone, about 1.75-million-birr worth cut flower stems were exported. Ethiopia has a great potential to produce onion every year for both local consumption and export with an average yield 13.3 tone /ha (CSA, 2014/15). Onions are cultivated in many regions of the world, but mainly on the northern hemisphere. Onions are part of the Liliaceae family, of the genus *Allium* that contains several hundreds of species (Shigyo and Kik, 2008). Despite onion is rapidly becoming the most popular vegetable among producers and consumers in Ethiopia, the present production level does not meet the demand of the country. Smallholder farmers, private growers and some larger state enterprises in many parts of Ethiopia cultivate onions. Areas with good soil and weather conditions for the cultivation of onions are the *Awash* valley, Lake region and areas close to the Sudan border (Desalenge and Aklilu, 2003).

In Ethiopia, the planted area for onions was 22,036 hectare (ha) in 2011, which corresponded to about 0.5 % of all onion-cultivated areas in the world. The production of onions in Ethiopia in 2011 was estimated to 236,922 tons, which was about 0.27 % of all world onion production (FAOSTAT, 2013). The Awash river crosses *Sebeta Hawas district* which is conducive for the onion production in this area. The production area is estimated to be 1170.5ha and the onion production is estimated to be 250,807.5qunals/year in *Sebeta Hawas district* (SHIO, 2016). Even though onion is largely grown in Ethiopia, the national average yield in general and at *Sebata Hawas district* in particular is low ranging from 0.5 to 0.8 tons per hectare, which is far below the corresponding yield recorded at research site (2.5 to 3 tons per hectare) using improved varieties (Habbte, 2004). The low national mean yield observed for onion could be attributed to various constraints related to low marketing facilities, lack of access to improved varieties of seed and poor cultural practices (Dawit *et al.,* 2012).

Sebeta Hawas district where the study focuses, is endowed with diverse natural resource, suitable for production of different annual and perennial crops. One major river, Hawash River, is of great importance It is used for irrigation during the dry season for the production of horticultural crops mainly vegetables. Major types of vegetable crops currently growing in the area include potato, cabbage, onion, tomato, beetroot and local cabbage. The nature of vegetable production is very fragmented and uncoordinated where all growers produce similar type of crop (SHIO, 2016).

Statement of the Problem

The major problem in onion value chain analysis was related to both onion production and marketing. The onion production is function of number of variables used in production process. The production of these vegetables depends on natural environment, input use and combination of inputs and management practices. The cultivation of onion in the study area is fragmented and uncoordinated where all onion growers produce the crop at the same time. Involvement of market intermediaries, lack of proper coordination among the value chain actors, and low marketing margins are shared among the actors as share to producers (SHIDA, 2016).

The availability and/or access to agricultural inputs (improved varieties/seeds, fertilizers, farm implements, good practices and relevant production and marketing information) are generally limited, more expensive and more variable due to poor road systems. According to Emana and Gebremedhin (2007), in eastern part of Ethiopia production of horticultural products is seasonal and price is inversely related to supply.

Onion production has a significant role in reducing poverty through employment generation, improving the feeding behavior of the people, and creating new opportunities for poor farmers (Dovonan et al., 2013). In order to expand the leading role agriculture plays in economic growth and poverty reduction, smallholder farmers need to improve their marketed surplus. A higher marketed surplus would help farmers to participate in a high-value market by increasing their level of income. Despite the importance of value addition for better income generation, smallholder farmers in the area continue to face numbers of challenges related to marketing (Lumpkin et al., 2005).

Problems in the onion value chain hinder the potential gains that could have been attained from the existing opportunities. In this regard, onion value chain analysis is an interesting process that has not been investigated much in the study areas. Both buyers and sellers in the study areas usually do not play collective roles towards one another and there are no onion processing activities. Under such circumstances, a study that focused on production problems, marketing problems, and roles and responsibilities of actors can play significant role towards the improvements of the existing systems. Debela (2013) recommended that further studies on onion marketing system should be conducted in all onion growing areas other than *Fentalle woreda* so that well organized regional and national onion marketing can be implemented. Value chain analysis of horticultural crops conducted by Emana (2008) in *Kombolcha Woreda* identified different production and marketing problems and the gross margin obtained by different actors. Daniels and Foris (2015) tried study the profit share actors in *Zuway and meki on* value chain analysis of onions by interviewing six producers in *meki* and *zuway* areas, two transporters, three brokers, nine wholesalers in Addis Ababa, seven retailers in Addis Ababa and nine consumers (restaurants) in Addis Ababa have participated in the research by answering the questions the interviews were not representative. According to Kumilachew et al. (2014) risks in vegetable production from the perspective of smallholder farmers‟ results suggest that production and price risks were generally perceived as the most important sources of risks.

Of all the risk sources, output price fluctuation, drought, pests/diseases, termites/insect attack, high costs of inputs, flood/high rainfall, illness/injury/death of operator/member, changes in family relations, theft, conflict and violence, changes in policy and rules, and high cost of credit were of important concerns in that order of importance. Market risks may be due to factors affecting the timely delivery of produce to markets or quality of produce (e.g. poor feeder roads, non-existence of storage/transportation facilities, bulk and perishable nature of the produce). Consequently, farmers are forced to sell their produce to the traders at cheaper prices. The steep fall in market prices during the harvest season has been the most common grievance of farmers. The development and upgrading of the value chains is an important agenda for the government, companies and other institutions. Entry into higher value markets (also global markets) requires an understanding of the requirements and dynamic forces within the value chain (Baker, 2006). Understanding of the existing onion inputs supply systems, production and marketing systems of onion is important for developing well organized value chain development in the study area. Even though some related studies were carried out in different regions of the country, such study that provides empirical evidence for improving the production and marketing of onion has not been undertaken in the study area. Therefore, there is a strong need to make value chain analysis to identify the major onion value chain actors and their roles, to identify constraints and opportunities along onion value chain, factors that affect volume of supply of onion, and to estimate marketing costs and margins at different market channel. However, the study on determinants of onion supply to market, and the benefit share of different actors in onion value chain were not done in the study areas. So, this study was proposed to investigate the value chain analysis of quantity onion produced and marketing, in *Sebeta Hawas Woreda*. Therefore, the crucial issue is that how this unorganized traditional marketing system be changed to modernized and organized market so that it will enable to increase the incentive of the producers to produce efficiently and thereby increase their income.

Research Questions

The study tries to answer the following questions:

1. What does onion value chain look like in the study area?
2. Which actor benefits more from onion value chain?
3. What are the determinants of onion supply to market in the study areas?
4. What are constraints and opportunity of onion in the study areas?

Generally Objectives of the Study

- The general objective of the study is to identify potential interventions that will make value chain of onion more competitive in the study areas.

The specific objectives of the study are

1. To identify onion value chain actors, supporters and their roles,
2. To analyze benefit, share of actors of onion value chain in the study areas,
3. To identify constraints and opportunity of onion in the study areas, and,
4. To analyze the determinants of onion supply to the market in the study areas.

Significance of the Study

The study analyzes the entire onion value chain from input supplier to the consumer within the Sebeta Hawas *Woreda*. Moreover, this study provides information on the determinants of onion supply to the market, benefit share of actors, and identifies supporters and enablers of onion value chain in the study areas. Therefore, it was shed light on required efforts to enhance the production and utilization of onion at larger scale to bring about economic development in the area. The information generated is also help a number of organizations including: research and development organizations, traders, producers, policy makers, extension service providers, government and non-governmental organizations to assess their activities and redesign their mode of operations and ultimately influence the design and implementation of policies and strategies.

Organization of the Thesis

The thesis has been organized in five chapters. Chapter one presents the background, statement of the problem, research questions, objectives, significance of the study, scope and limitations of the study and organization of the thesis.

Chapter two presents review of theoretical and empirical evidences related to the study topic. Chapter three discusses research methodology covering description of the study area, data types and sources, methods of data collection, sampling techniques and methods of data analysis. Chapter four presents results and discussions including descriptive, value chain analysis and econometric results. The last chapter summarizes the main findings of the study and draws conclusion and recommendations.

LITERATURE REVIEW

Definition of Value Chain Management

Value chain: The value chain is a concept which can be simply described as the entire range of activities required to bring a product from the initial input-supply stage, through various phases of production, to its final market destination. The production stage entails a combination of physical transformation and the participation of various producers and services, and the chain includes the product's disposal after use. As opposed to the traditional exclusive focus on production, the concept stresses the importance of value addition at each stage, thereby treating production as just one of several value-adding components of the chain (UNIDO, 2009).

A value chain describes the entire range of activities undertaken to bring a product from the initial input-supply stage, through various phases of processing, to its final market destination, and it includes its disposal after use. For instance, agro-food value chains encompass activities that take place at the farm or rural level, including input supply, and continue through handling, processing, storage, packaging, and distribution. As products move successively through the various stages, transactions take place between multiple chain stakeholders, money changes hands, information is exchanged and value is progressively added (UNIDO, 2009).

Supply Chain: It is the physical flow of goods that are required for raw materials to be transformed into finished products. Supply chain management is about making the chain as efficient as possible through better flow scheduling and resource use, improving quality control throughout the chain, reducing the risk associated with food safety and contamination, and decreasing the agricultural industry's response to changes in consumer demand for food attributes (Dunne, 2001).

A value chain is the full range of activities required to bring a product from conception, through the different phases of production and transformation. A value chain is made up of a series of actors (or stakeholders) from input suppliers, producers and processors, to exporters and buyers engaged in the activities required to bring agricultural product from its conception to its end use (Kaplinsky and Morris, 2001). Bammann (2007) identified three important amount of value chain.

- **Value chain actors:** The chain of actors who directly deal with the products, i.e. produce, process, trade and own them.
- **Value chain supporters**: The services provided by various actors who never directly deal with the product, but whose services add value to the product.
- **Value chain influencers***:* The regulatory framework, policies, infrastructures, etc.

The value chain concept entails the addition of value as the product progresses from input suppliers to producers and consumers. A value chain, therefore, incorporates productive transformation and value addition at each stage of the value chain. At each stage in the value chain, the product changes hands through chain actors, transaction costs are incurred, and generally, some form of value is added. Value addition results from diverse activities including bulking, cleaning, grading, and packaging, transporting, storing and processing (Anandajayasekeram and Berhanu, 2009).

Value chains encompass a set of interdependent organizations, and associated institutions, resources, actors and activities involved in input supply, production, processing, and distribution of a commodity. In other words, a value chain can be viewed as a set of actors and activities, and organizations and the rules governing those activities. Value chain management is about creating the added value at each link in the chain and a sustainable competitive advantage for the businesses in the chain. How value is actually created is a major concern for most businesses. Porter (1985) indicates that value can be created by differentiation along every step of the value chain, through activities resulting in products and services that lower buyers' costs or raise buyers' performance. In much of the food production and distribution value chain, the value creation process has focused on commodities with relatively generic characteristics, creating relatively small profit margins.

Major of Agricultural Value Chain Analysis

Effective Demand

Agricultural products differ from manufactured goods in terms of supply and demand. Agricultural products supply is different because of the very seasonal biological nature while their demand is comparatively constant throughout the year. In economic theory, it is stated that human being is always under course of action of choice from a number of options. The basis for the decisions could be issues ranging from household characteristic to the exogenous unmanageable factors. A case in point here is market supply where researchers put each owns point of determining variables (Welday, 2003).

Effective demand can be defined as the force that pulls goods and services through the vertical system, in agricultural value chain analysis. Hence, value chain analysis need to understand the dynamics of how demand is changing at both domestic and international markets, and the implications for value chain organization and performance. Value chain analysis also needs to examine barriers to the transmission of information in the changing nature of demand and incentives back to producers at various levels of the value chain (MSPA, 2010).

The analysis can identify factors affecting market supply. A clear understanding of the determinants helps to know where to focus to enhance production and marketable supply. The study of market supply helps to fill the gap for success of commercialization. There are different factors that can affect market supply. According to Welday (2003) Market supply refers to the amount actually taken to the markets irrespective of the need for home consumption and other requirements where as the market surplus is the residual with the producer after meeting the requirement of seed, payment in kind and consumption by peasant at source.

Value Chain Governance

Governance refers to the role of coordination and associated roles of identifying dynamic profitable opportunities and apportioning roles to key players (Kaplinsky and Morries, 2000).

Value chains imply repetitiveness of linkage interactions. Governance ensures that interactions between actors along a value chain reflect organization, rather than randomness. The governance of value chains emanates from the requirement to set product, process, and logistic standards, which then influence upstream or downstream chain actors and results in activities, roles and functions (Anandajayasekeram, 2009).

According to Raikes *et al.* (2000), trust-based coordination is central for goods and services, whose characteristics change frequently, making a standardized quality determination for the purposes of industrial coordination difficult. This applies to the manufacturing industry as well as agri-food chains. It is possible to identify in one industry several coordination forms used by different firms where the choices rely on the trust existent between the firms. Value chains can be classified into two based on the governance structures: buyer-driven value chains, and producer-driven value chains (Kaplinisky and Morris, 2000). Buyer-driven chains are usually labor-intensive industries, and so more important in international development and agriculture. In such industries, buyers undertake the lead coordination activities and influence product specifications. In producer-driven value chains which are more capital intensive, key producers in the chain, usually controlling key technologies, influence product specifications and play the lead role in coordinating the various links. Some chains may involve both producer and buyer driven governance. Yet in further work (Humphrey and Schmitz, 2002, Gibbon and Ponte, 2005) it is argued that governance, in the sense of a clear dominance structure, is not necessary a constitutive element of value chains. Some value chains may exhibit no governance at all, or very thin governance. In most value chains, there may be multiple points of governance, involved in setting rules, monitoring performance and/or assisting producers.

Chain governance should also be viewed in terms of 'richness' and 'reach', i.e., in terms of its depth and pervasiveness (Evans and Wurster, 2000). Richness or depth of value chain governance refers to the extent to which governance affects the core activities of individual actors in the chain. Reach or pervasiveness refers to how widely the governance is applied and whether or not competing bases of power exists. In the real world, value chains may be subject to multiplicity of governance structure, often laying down conflicting rules to the poor producers (MSPA, 2010).

Value chain upgrading

Upgrading refers to the acquisition of technological capabilities and market linkages that enable firms to improve their competitiveness and move into higher-value activities (Kaplinsky and Morris, 2000).

Upgrading in firms can take place in the form of process upgrading, product upgrading, functional upgrading and chain upgrading. Upgrading entails not only improvements in products, but also investments in people, know how, processes, equipment and favorable work conditions. Empirical research in a number of countries and sectors (*e.g.* Humphrey and Schmitz, 2000, Humphrey, 2003, Humphrey and Memedovic, 2006) provide evidence of the importance of upgrading in the agricultural sector.

Empirical Review

Studies on Value Chain Analysis

Keyser (2010) employed quantitative value chain methodology to analyze the competitiveness of Malawis key agricultural commodities, tobacco, maize, cotton, and rice using prices that prevailed in the 2007/08 agricultural season. It assessed the country's prospects for competitiveness and suggests weak links along the value chain that require attention in order to improve trade competitiveness. The results indicate that Malawi had some competitive advantage in the production and exportation of tobacco and cotton, and that this mostly derives from its low labor cost advantage. However, the results indicate that based on 2007/08 prices and costs, Malawi did not have competitive edge in maize and rice production for export. As such, Malawi would better pursue an import substitution strategy in these cereals, and perhaps only aim at the export market when regional market opportunities arise. Key factors that underpin Malawi's narrow competitiveness include the high cost of inorganic fertilizer and other inputs, low productivity, and the higher trader margins and intermediation costs along the value chains. Emana (2010) conducted market assessment and value chain analysis aimed at identifying potential commodities for value chain development and income generation along with identifying associated constraints and opportunities for improvement. The result showed that Mango, oil seeds, and honey were selected for value chain intervention. The study also revealed that key opportunities that contribute to the value chain development of selected commodities include availability of ample land and good climate for production; expansion of road infrastructure especially road connecting the *woreda a*s to the main market centers and road connecting to the Sudan, good vegetation cover and ample bee colonies as well as existence of raw materials for beehives construction experiences of production for the selected value chain products, existence of good market demand for the products, high interest of farmers to participate in value chain products, and existence of exporters currently interested to involve in the processing and/ or marketing of the value chain products. Similarly, opportunities identified for income generation were existence of land and conducive climatic condition for crop and livestock production, good market for small ruminants in the local markets and neighboring Sudan road infrastructure connecting *the woreda a*s to regional town and to the Sudan, existence of limited skill in income generation activities. On the other hand challenges that need to be addressed to realize income generation activities were poor working culture and agricultural practice in the area, lack of skill in modern agricultural practices, poor quality of products and low prices, low productivity and production, no market information system for effective agricultural marketing, limited access to market, lack of processing, preservation and transportation facilities for the products, capital shortage and lack of access to credit, water shortage during dry season, wild fire and pests and diseases. A value chain approach used by Dereje (2007) to study the competitiveness of Ethiopian coffee in the international market suggested policy intervention to improve farmers' performance after identifying that Ethiopian farmers have low level of education, large family size with small farm land and get only 3 % of the retail price in the German market. Fitter and Kaplinsky (2001) conducted value chain analysis to examine inter-country distributional outcomes of global coffee sector by mapping input-output relations and identifying power asymmetries along the coffee value chain. The study showed that returns to product differentiation taking place in the face of globalization do not accrue to the coffee producers. They also found that power in the coffee value chain was asymmetrical. At the importing end of the chain, importers, roasters and retailers compete with each other for a share of value chain rents but combine to ensure that few of the rents return to the farmer or the producer country. Ponte (2002) also conducted a value chain analysis to examine the impact of deregulation, new consumption patterns and evolving corporate strategies in the global coffee chain on the coffee exporting countries in the developing world. The study concluded that the coffee chain was increasingly becoming buyer-driven and then coffee farmers and the producing countries were facing a crisis relating to changes in the governance structure and the institutional framework of the coffee value chain.

Horticulture value chain analysis conducted by Emana (2008) in Eastern parts of Ethiopia identified different problems including low price for the products, lack of marketing institutions safeguarding farmers' interest and rights over their marketable produces (e.g. cooperatives), lack of markets to absorb the production, large number of middlemen in the marketing system, lack of coordination among producers to increase their bargaining power, poor product handling and packaging, imperfect pricing system and lack of transparency in market information communications.

A value chain study by Dendena et al. (2009) indicated that the mango sub sector faces some challenges as lack of appropriate production, long and inefficient supply chains, disorganized and fragmented industry with weak value chain linkages, and inadequate information flows and finally recommended institutional innovation to reduce the above challenges.

Emana (2010) identified the key actors and functions of oil seeds of sesame value chain in Benishangul Gumuz. He identified the role of oil seeds value chain actors and its activity such as producers, collectors (local traders), Local/Regional wholesalers, and commission agents, Wholesalers in Addis Ababa, Exporter, Processors, and Consumers. He also examined other actors along the value chain include transporters and facilitators like the agricultural inputs suppliers, extension services by the government institutions, research centers who generate and disseminate improved agricultural technologies. Bammann (2007) has identified three important levels of value chain. Value chain actors; the chain of actors who directly deal with the products, i.e. produce, process, trade and own them, value chain supporters; the services provided by various actors who never directly deal with the product, but whose services add value to the product and value chain influencers; the regulatory framework, policies, infrastructures, etc. Value chain study conducted on off-season vegetables by USAID (2011) in Nepal indicated that the subsector faces some challenges such as unavailability of quality planting materials, lack of knowledge among the producers of the proper usage of fertilizers and pesticides as well as poor soil fertility management, lack of irrigation facilities, labor shortage, postharvest loss due the perishable nature of vegetables, limited access to reliable market information, unorganized market center, limited collection centers, and lack of proper packaging and transportation facilities. The study recommended short-term and long term infrastructural and institutional innovation to reduce the above challenges. M4P (Making market systems work better for the poor) is an approach to developing market systems so that they function more effectively, sustainably and beneficially for poor people, building their capacities and offering them the opportunity to enhance their lives. Applicable to development agencies and governments working in both economic and social fields, it is an approach defined by a number of important characteristics (DFID and SDC, 2008). M4P is an approach to development that provides guidance not only on understanding of the poor in market systems (analysis) but on how to bring about effective change (action). Analysis should identify the underlying constraints impinging upon market systems and concentrate on addressing these. Its focus is on developing market systems, assessed with respect to different market functions and players, public and private, formal and informal. This systemic character of M4P defines many of its most important features. By addressing underlying causes (rather than symptoms) of weak performance, M4P aims to unleash large-scale change. Interventions may be small in themselves but should continually strive to leverage the actions of key market players to bring about extensive and deep-seated systemic change (DFID and SDC, 2008).

Determinants of onion supply to market

Abraham (2013) analyzed the determinants of vegetable supply to the market by using multiple linear regression in the case of *Habro and Kombolcha woreda a*s of Oromia region, Ethiopia and the result indicated that market supply is significantly affected by access to market information and quantity of tomato produced, access to extension service, access to market information, vegetable farming experience and quantity of potato produced in the case of potato; and *woreda* dummy, non/off-farm activities, distance to the nearest market and quantity of cabbage produced in the case of cabbage. Sarkar and Roy (2013) used multiple linear regression model to analyzed factors affecting marketed. A Case study in some woredas of West Bengal 1 and 2 Agro-Economic Research Centre, Visva Bharati and concluded that it is evident that factors like farm size, average price received by the farms, access to credit and possession of pucca storage have significant positive relationship with marketed while factors like household size, indebtedness of farm households exhibit a significant negative relationship with marketed.

Aman (2018) used multiple linear regression model to identify the major factors that determine the level of quantity supplied to market of tomato in Toke Kutaye district, Oromia, Ethiopia. Tomato yield, land, distance from nearest market, training and price expectation significantly affected tomato quantity supplied to market. Out of significant variables distance from nearest market and price expectation are the variables which influences dependent variable negatively.

Abay (2007) identified the major factors that affect the supply of vegetables (onion and tomato) at *Fogera* woreda in that owned oxen number, family size, and distance from development agent and experience has affected marketable supply of onion and tomato. Tadesse (2011) used tobit model to identify total volume of vegetable supplied to market in Daro labu district West Hararghe Zone, Oromia, Ethiopia. Accordingly, access to irrigable land, experience in vegetable production and total crop land are the significant factors affecting the quantity produced and supplied.

Similarly, Debela (2013) in their study of onion marketing in the case of Fentale district identified variables that determine quantity onion supply by using tobit model. Out of 15 variables, 5 were found to significantly influence the quantity of onion supplied to the market. Accordingly, family size of the household, non-farm income of the household, total land size of the household, total quantity of onion produced and access to credit services significantly affected the quantity of onion supplied to the market.

Such reviews were very important in identifying missing gaps of the earlier studies and suggests hypothesis that were tested empirically. Changes are taking place on the determinants of value addition and/or marketed surplus over time. Hence, conducting such study in different localities at different times is very help full to capture the effects of the changing situations on the value addition and marketed surplus by smallholder farmers. In general, from the above reviews it can be noted that farmers' value addition and marketed surplus of agricultural commodities vary mainly due to variations in farmers' access to market infrastructures and information, resource endowments, agricultural extension services, and the socio-economic conditions of the farmers in general.

From these reviewed literatures severe production seasonality, uncoordinated and fragmentation of marketing, information gap, extension services, education, access to road are factor affecting onion production and marketing and the critical problems encountered onion production in Ethiopia.

Benefit share of actors along onion value chain

Adunga (2009) indicates that 46.93 % of the total gross marketing margin was added to onion price when it reached the final consumers (wholesaler) at domestic markets. From the total gross marketing margin, 21.07 % was gross marketing margin of assemblers (received by assembler) while 25.86 % was that of wholesalers. The profit of farmers per quintal was 117.34 ETB per quintal which seems greater than the profit obtained by wholesalers and assemblers which was about 47.80 ETB and 35.04 ETB, respectively. This situation implies that there is good performance of the onion market chain. In this market chain, it indicates, if the market chain further improved in terms of efficiency producers can harvest more than what they had obtained.

According to Daniels and Fors (2015), the yearly profit for the average wholesaler was more than 900,000 ETB while the average farmer's yearly profit is about 58,000 ETB. A study conducted on analysis of onion marketing of *fentalle woreda* by Debela (2013) show that profit share of producer, rural assembler, urban assembler, wholesaler and retailer were 24.73 Birr/qt, 20.65 Birr/qt., 62.88 Birr/qt., 111.65 Birr/qt. and 18.4 Birr/qt. respectively. This shows that wholesalers get the highest profit.

Conceptual Framework of the Study

A value chain is a chain of activities where products pass through all activities of the chain in sequence, and at each activity the product gains some value. First by identifying the actors and then mapping the product flows from producer to consumer by showing activities of input supply to consumption. The objective is to identify onion value chain and examine the performance of actors in the chain, determinants of onion supply to the market along onion value chain. The mapped value chain includes the actors, their relationships, and benefit share at each stage. Value chains can be viewed as a network of different functions or stages from production to consumption, including all ancillary support services. With regard to actors, the structure of onion value chain tries to include all the major actors and enablers (service providers and influencers) from production, processing, marketing to consumption.

The governance, upgrading components, distribution, finance flow and marketing aspects of value chain will be discussed in this study. Factor affecting quantity of onion market supply will be identified in this study.

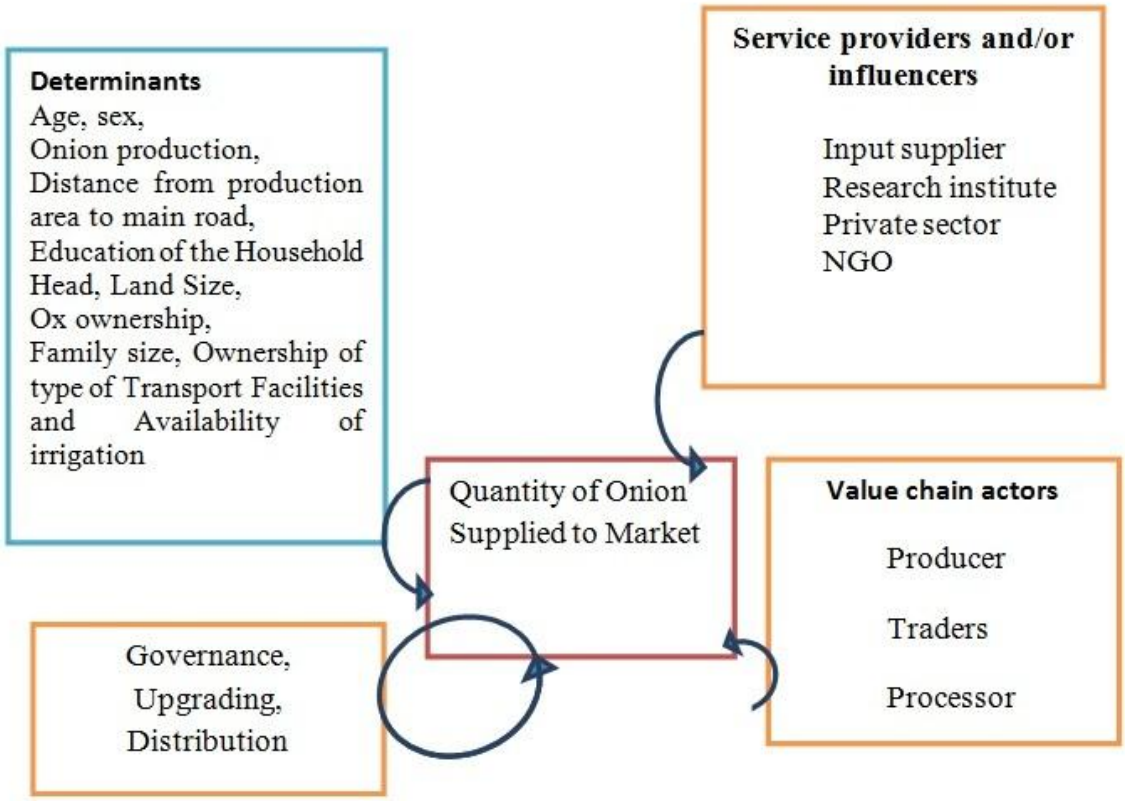

Figure 1. Conceptual frame work.

RESEARCH AND METHODOLOGY

Description of the Study Area

The *Sebeta Hawas woreda* administrative center is Sebeta town. It is found 25 km from South –West of Addis Ababa along the *Jimma* main road. The total area of the woreda is 87,572 hectares. The woreda is found at a latitude of 8^0 37' N and longitude of 38^0 45' E. The average altitude of the woreda is 2593 meter above sea level. The mean annual rainfall of the woreda is about 1033mm. Its mean annual temperature is about 21.5^0C. The woreda has good vegetation cover. The soil type that existed in the woreda is black (61 %), red (34 %) and mixed soil (5 %). The land use of the woreda by hectare is cultivated land 54,943.3, pasture land 3642.2, forest 2533.7, water bodies (ponds, rivers, etc.) 1475, building (residential, settlement, etc) 5907, investment 124 has been found respectively (SHFEDO, 2011).

The *woreda* has 41 rural *kebeles* and 2 urban centers (*Tefki* and *Awash-Melkakunture*). The total population in 2007 was 133,746 of which 68,908 (51.5 %) were males while 64,838 (48.48 %) were females (CSA, 2007). Population density of the woreda is 2 persons per hectare. The average number of persons per household is 5 and the total number household live in the woreda is estimated to be 26056 (WMEO, 2013).

Both livestock rearing and crop production are the main economic activities of the majority of communities. Teff, wheat, and sorghum are the major cereal crops grown in the woreda. Potato, cabbage, onion, beetroot and tomato are the major vegetables grown in the woreda.

The major livestock reared in the woreda include cattle, sheep, goats and poultry. Numerous farmers have no adequate farm land. More than 55% of the farm households owned less than 1.5 hectare of land-holding per household (SHAO, 2014). As a result, farmers produce less number of livestock and amount of crop production. Out of total population (133,746), 88 percent of the populations have been engaged in mixed economic activities (both crop production and livestock rearing).

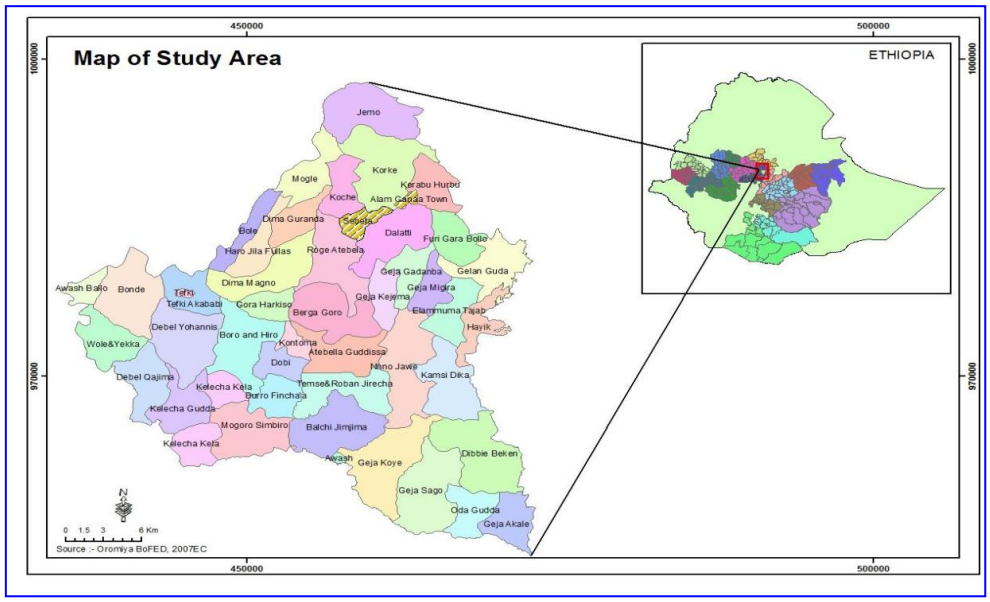

Figure 2. Map of the study area.
Source: Oromia Finance and Economic Development Bureau, (2015)

Data Types and Sources of Data

Both primary and secondary data were collected. Primary data were collected from producers/ farmers and wholesalers, collectors, commission agents, retailers, processor. In order to generate sufficient information for this study, both primary and secondary data from different sources were collected. Secondary data on population size of the study areas, list of kebele administration, list of licensed onion traders, production and retail prices of onion and cooperatives engaged in onion business were taken from the Central Statistical Agency (CSA) and Trade and Market Development Office of the *Woreda* and Zone. The kebeles were selected purposively depending on the quantity of onion produced.

Sampling Technique and Sampling Size

For this study, *Sebeta Hawas Woreda* purposively selected. In order to select a representative sample, a multi-stage sampling technique was implemented to select onion producer kebeles and sampled farm households.

In the first stage, with the consultation of *Woreda* agricultural experts and development agents, out of 8 kebeles of *Sebata Hawas* four (4) onion producer kebeles were randomly selected based on the level of production. In the second stage, using the list of households in the sampled kebeles, 245 sample farmers were selected at 95% confidence interval based on the total number of onion producers selected from four kebeles using the following formulas.

Adequate sample size was needed for the purpose of econometric analysis and descriptive analysis. Thus, sample size was determined using the formula used by Cochran (1963)

$$n_0 = \frac{Z^2 pq}{e^2} \quad \text{----------(1)}$$

Where, n_o is the sample size, Z is the standard normal distribution (1.96) at α= 0.05, p is the estimated proportion of an attribute that is present in the onion producer population from the woreda (in this case 20 % of population is considered), q is 1-p, and e is the desired level of precision, (in this case 0.05).

Therefore,

$$n = \frac{(1.96^2)(0.2*0.8)}{0.05^2} = 245$$

Table 1. Sample distributions producers of onion in *Sebata Hawas* woreda.

Name of selected Kebeles	Total number Of onion Producers	Proportion of households onion producers	Number of sample Households
Awash Belo	150	0.18	44
Waleyeka	181	0.22	54
Ilamu	354	0.42	103
G/Guda	153	0.18	44
Total	**838**		**245**

Source: Own computation from SHIO and Kebele administration data

Rural assemblers, wholesalers, and brokers sampling

It was estimated that about 67 rural assemblers, 44 licensed and many illegal brokers, and 20 wholesalers used to participate in the marketing of the product with others vegetables. Among them, 32 rural assemblers, 20 brokers and 10 wholesalers were randomly selected for a detail interview. In fact, frequent rapid informal and observational surveys were followed.

Retailers' and Consumers' sampling

For this study, out of 200 retailers, data were collected from 20 retailers selected randomly. There are many processors and consumers in study area while for this study, randomly 10 processors (*Baltina and Bebere* maker) and 20 consumers from *Sebeta* were selected for interviewing. The sites for the retailer surveys were markets in the towns in which a good sample of onion retailers existed. The retailer and consumers' survey were destined to understand the demand for the products. The survey was conducted in the selected *kebeles* of *Sebete Hawas woreda* and terminal market in Addis Ababa.

Data Collection Method

Enumerators who have college diploma/level IV and working as development agents were recruited and trained for data collection. Before data collection, the questionnaire was pre-tested with farmers and traders to evaluate the appropriateness of the design, clarity and interpretation of the questions, relevance of the questions and time taken for an interview. Hence, appropriate modifications and corrections were made to the questionnaire. Data was collected under continuous supervision of the researcher.

Randomly selected 245 individual household heads were interviewed from four kebeles from April to May 2017. Both qualitative and quantitative data were collected and used for the analysis. Thus, focus group discussions were held with three groups based on predetermined checklists and a total of 10 key informants were interviewed from 6 different organizations and institutions of supporters and influencers. The time allotted for each discussion was 45min to 1 hour. Suitably, the data generation at various levels was by field observations and triangulation with other data. Individual households were interviewed using structured questionnaire at the village level. The questionnaire covered different topics in order to capture relevant information related to the study objectives. And it was prepared as simple as possible to capture information.

Method of Data Analysis

Descriptive statistics and econometric analyses were used to analyze the data. For both methods STATA version 13 was employed.

Descriptive Statistics Analysis

These methods of data analysis refer to the use of percentages, means, standard deviations, t-test, F-test and maps in the process of examining and describing marketing functions, facilities, services, and household characteristics. Mapping the onion value chain included identifying actors, describing the value additions, examining the governance, estimating share value in onion value chain.

Value Chain Analysis

The value chain analysis includes mapping the activities as they relate to the product then this map is used to examine the industry or business. This is a very important in evaluating accounting and presenting the value in the product from the raw components to the final product that is consumed by the end user. As Porter (1985) determine, value chain analysis is a great tool to uncover a firm or industry's competitive advantage (Diaz, 2009). In this study the following value chain aspects were applied (Kaplinsky and Morris, 2001).

Mapping the Value Chain is to understand the characteristics of the chain actors and the relationships among them, including the study of all actors in the chain, of the flow of onion through the chain, of employment features, and of the destination and volumes of domestic and foreign sales. This information was obtained by conducting surveys and interviews as well as by collecting secondary data from various sources.

Identifying the distribution of actors benefits in the chain. This involves analyzing the margins and profits within the chain and therefore determined who benefits from participating in the chain and who will need support to improve performance and gains

Defining upgrading needed within the chain by assessing profitability within the chain and identifying chain constraints, upgrading solutions will be defined (Kaplinsky and Morris, 2001). These may include interventions to:

(i) Improve product design and quality and move into more sophisticated product lines to gain higher value and/or diversify production;

(ii) Reorganize the production system or invest in new technology to upgrade the process and enhance chain efficiencies;

(iii) Introduce new functions where in the chain to increase the overall skill content of activities; and

(iv) Adapt the knowledge gained in particular chain functions in order to redeploy it.

Emphasizing the Governance Roles

Within the concept of value chain, governance defines the structure of relationships and coordination mechanisms that exist among chain actors. By focusing on governance, the analysis identified actors that may require support to improve capabilities in the value chain, increase value added in the sector and correct distributional distortions. Thus, governance constituted a key factor in defining how the upgrading objectives could be achieved.

Following the above procedure, the main aspects of onion value chain analysis is done by applying some quantitative and qualitative analysis. First, an initial map is drawn which depicts the structure and flow of the chain in logical clusters. This exercise is carried out in qualitative and quantitative terms through graphs presenting the various actors of the chain, their linkages and all operations of the chain from pre-production (supply of inputs) to consumption. After having developed the general conceptual map of the value chain, the next step is analyzing the chain's economic performance and benefit share of actors.

Analysis of Benefit Share of Onion Actors

Estimates of the marketing margins are the best tools to analyze performance of market. Marketing margin is calculated by taking the difference between producers and retail prices. The producers' share is the commonly employed ratio calculated mathematically as, the ratio of producers' price to consumers' price. Mathematically, producers' share can be expressed (Abrahim, 2013) as:

$$\mathrm{PS} = \frac{Pp}{Cp} = 1 - \frac{MM}{Cp} \text{----------(2)}$$

Cp=1− Where: PS= Producer's share

Pp= Producer's price

Cp = Consumer price

MM = marketing margin

The above equation tells us that a higher marketing margin, diminishes producers share and vice versa. It also provides an indication of welfare distribution among production and marketing agents.

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

$$\text{TGMM} = \frac{Consumer\ price - Producer\ price}{Consumer\ price} \quad \text{----------(3)}$$

Where, TGMM=Total gross marketing margin.

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

$$\text{NMM} = \frac{Gross\ marketing\ margin - Marketing\ cost}{Consumer\ price} * 100 \quad \text{----------(4)}$$

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

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

TGMM = Consumer's price – Farmer's price---------- (5)

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

$$\text{GMMi} = \frac{\text{Spi} - Ppi}{TGMM} * 100 \quad \text{----------(6)}$$

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

Total gross profit margin will be computed as:

TGPM=TGMM-TOE ----------(7)

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

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

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

$$\text{GPMi} = \frac{\text{GMMi} - OEi}{TGPM} * 100 \quad \text{----------(8)}$$

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

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

OEi =Operating expense at i^{th} link

TGPM=Total gross profit margin

Identifying Challenges and Opportunity of Onion Value Chain

The challenge that hinders production and productivity of onion in the study areas should be identified and mentioned to increase production and productivity of onions. On another side there should be analysis the opportunity the area must identified in order to exploit the potential of the study area, this can computed by non-parametric estimation Kendall's cordance coefficient.

Econometric Analysis

This part of the analysis deals with the analysis of understanding determining variables for production participation, and volume of the onion supplied to market. For managing this, proposed methodology multiple linear regression models will be used

Econometric Analysis of Quantity of Onion Supply to Market

Different studies employed different models in order to identify the factors that determine market supply (Dawit et al., 2012, Tinsae, 2008, Ayelech, 2011, Mohammed, 2012, Sarkar and Roy, 2013 and Abraham, 2013). In this study, multiple linear regression models will be used to analyze quantity of onion supply to the market in the study areas. This model is also selected for its simplicity and practical applicability (Greene, 2000). Multiple linear regression model specification of supply function in matrix notation is the following.

$$\mathbf{Y} = \mathbf{X}'\boldsymbol{\beta} + \mathbf{U} \quad \text{.....9}$$

Where: Y = quantity of onion supplied to market Y

X' = Vectors of explanatory variables X'

β = a vector of parameters to be estimated

u= disturbance term U

There are two measures that are often suggested to test the existence of multicollinearity. These are: Variance Inflation Factor (VIF) for association among the continuous explanatory variables and Contingency Coefficients (CC) for dummy variables. To detect multicollinearity problem for continuous variables, variance inflation factor (VIF) defined as:

$$(VIF) = \frac{1}{1-\mathrm{Rj}^2} \quad \text{----------10}$$

As a rule of thumb, Gujarati (2004) states that if the VIF value of a variable exceeds 10, which will happen if Rj^2 (explained variation) exceeds 0.90, then, that variable is said to be highly collinear. Therefore, for this study, variance inflation factor (VIF) is used to detect multicollinearity problem for continuous variables. On the other hand, contingency coefficient is used to check multicollinearity of discrete (dummy) variables. It measures the relationship between the raw and column variables of a cross tabulation. The formula for contingency coefficient is as follows:

$$CC = \sqrt{x^2}/_{n + x^2} \quad \text{----------11}$$

Where, CC is contingency coefficient, χ2 is chi-square value and N is total sample size. The decision criterion with the contingency coefficient is that if the value of CC is greater than 0.75, the variables are said to be collinear (CC > 0.75).

Variable Definition and Working Hypothesis

In this study factors influencing onion supply to the market, factors potentially influence and how (the direction of the relationship) these factors are related with the dependent variables are defined as follows:

Dependent Variables

Quantity of Onion Supplied to Market (QTOSM): It is continuous dependent variable used in the multiple linear regression model equation. It is measured in quintal (100kg) onion supplied by farm household to the market in the survey year.

Independent Variables

Age of Household Head (Age): It is a continuous variable and measured in years. Aged of households are believed to be wise in resource use, on the other hand young household heads have long investment horizon and it is expected to have either positive or negative effect on volume of onion sales. A study conducted by Debela (2013) analyzed onion marketing in the case of *Fentale Woreda* show that the age of sample household heads ranged from 24 to 69 years with a mean of 38.82.

Sex of the Household Head (Sexhh) - This is a dummy variable. It could take positive or negative signs of coefficients. According to Debela (2013), about 90% of sample household heads were male and the rest 10% were female. A study by Tadesse (2011) show that about 53% of the family members was male while 47% were female and on average 6.5 persons are living in each household.

Onion Production (OPRODN): It is continuous dependent variable and represents the amount of onion produced by sample producers measured in quintals produced. A marginal increase in onion production has obvious and significant effect on the volume of onion supply. The volume of production of onion is expected to have positive relation to market participation and marketable surplus. Abay (2007) and Adugna (2009) found that the amount of tomato, papaya, avocado and mango produced by farming households has augmented marketable supply of the commodities significantly.

Distance from production area to main road (Dfptmr): This is a continuous variable included in the model to indicate the distance of household from the main road. As the crops are bulky the proximity to the road will affect the amount produced to participate in the product market. There is no doubt that transport is of great importance for marketing agricultural produce. In particular, rural communities in remote areas suffer from lack of transportation facilities. This happens due mainly to absence of adequate means of transformation and due to poor infrastructural conditions like roads (Robbins *et al.,* 1990). It is measured in single feet hours; the more time needed to reach a main road and is expected to take a negative sign.

Education of the Household Head (HEduc): This variable was measured in terms of formal schooling of the household head and hypothesized to affect marketable supply positively. It is continuous variable from illiterate to formal education starting from grade one to higher degree. This is due to the fact that a farmer with good knowledge can adopt better practices than illiterates that would increase marketable supply. Formal education enhances the information acquisition and adjustment abilities of the farmer, thereby improving the quality of decision making (Fakoya et al., 2007). Therefore, this variable will be hypothesized to influence volume of onion sales positively.

Ox Ownership (OXNo): This is a continuous variable that is measured by the number of oxen owned by the household and expected to affect the marketable supply of onion positively. This is due to the fact that producers who own oxen are more likely to till land in time than producers who own less oxen. Thus, they produce more which can be reflected on marketable supply.

Extension Service (EXT_SER): This is a continuous variable refers to frequencies of extension services to household Extension is expected to have positive effect for market participation through its stimulation of production and productivity. Farmers that have frequently contact with DAs will have better access to information and could adopt better technology that would increase their marketable supply of vegetables.

Family Size (Fshh) – this is the total number of family members that can be taken as labor consumption for onion production. It is a continuous variable, measured in man equivalent i.e. the labor force that the farm households used for the production of onion during the production year of 2015/16. It is assumed to affect positively the production of the product. This assumption was due to the labor consumptions character of onion production.

Ownership of type of Transport Facilities (OTran): Specifically, vehicles, carts and transport animals would be used to measure the availability of produce transportation facilities by households. In cases where households owned transportation facilities, the variable took the value of one, and zero if the household did not own any form of transport facility. The availability of transportation facilities helps reduce factor related to market distance with the potential to constraint supply (Jagwe, 2007).

Availability of Irrigation (AOIRR): This is a dummy variable which takes a value of 1 if the households have access to irrigation 0 otherwise; was one of the most important inputs for these vegetable productions in the study area, where erratic and inadequate rainfall is common. Lack of irrigation facilities causes inadequate production in farms. A study conducted by Tadesse (2011) showed that farmers who have access to irrigation are using irrigable land for the production of high value cash crops. The result of Tobit model depicted the availability of irrigation had negative marginal effect on production of vegetables (Tadesse, 2011).

Table 2. Summary of Variables.

Variables	Description	Category	Value	Expected
Dependent Variables				
QTOSM	Quantity of onion supplied to market	Continuous	Quantity of onion supplied to the market	
Independent Variables				
AGE	Age of household head	Continuous	Age in years	-
SEXHH	Sex of household head	Dummy	0 if male and 1if female	+
DFPTMR	Distance from production area to main road	continuous	Distance of household from the main road	-
HEDUC	Education of the Household head	Continuous	Year in school	+
OPRODN	Onion produced	Continuous	Amount of Onion produced by sample producers measured in quintals	+
OX_OWN	Ox ownership	Continuous	number of pair oxen household owned	+
EXT_SER	Extension service	Continuous	Frequencies of extension services given to household	-
FSHH	Family size	Continuous	In adult equivalent	+
OTRAN	Ownership of type of transport facilities	Dummy	1 if households owned transportation facilities and 0 otherwise	+
AOIRR	Availability of irrigation	Dummy	1 if access to irrigation and 0 otherwise	+

RESULTS AND DISCUSSION

This chapter presents the major findings of the study. It has three main sections. The first section deals with descriptive and inferential statistics of the sample households. The second section presents value chain analysis of onion which includes value chain map, actors and their roles, and value chain governance. The third section presents the result of multiple linear regression models.

Household and Farm Characteristics

Household Characteristics

The age of sample household head ranged from 20 to 72 years with a mean of 42.38. The analysis for family size of onion producing households also showed that the family size ranged from a minimum of 1 to 12.5 with an average family size of 4.55 in adult equivalent. The survey result depicted that about 72.24 % of sample household heads were male and the rest 27.76 % were female. Regarding religious aspect, the majority of the respondents' were Orthodox (92.24 %) and the rest 3.27, 2.45 and 2.04 (%) were protestant, *wakefeta* and Muslim respectively, and therefore from the result observed that majority of respondent were followers of orthodox religion. As indicated in table 3, the majority (84.90 %) of sample respondents were married whereas 2.45 % and 5.71 % were divorced and widowed, respectively.

Table 3. Distribution of respondents by socio- demographic characteristics.

Variables	Description	Number of Household (N= 245)	Percent
Sex	Female	68	27.76
	Male	177	72.24
Marital status	Single	17	6.94
	Married	208	84.90
	Divorced	6	2.45
	Widows	14	5.71
Religion of household	Muslim	5	2.04
	Orthodox	226	92.24
	Protestant	8	3.27
	Wakefata	6	2.45

Table 4.

Variables	N	Mean	Std. Dev	Min	Max
Agehh	245	42.38367	9.884981	20	72
AEU	245	4.552653	2.029779	1	12.5
Edu2	245	4.591837	3.800983	0	12
Distance	245	16.32653	6.908618	4	25
Land	245	2.80102	1.007883	5	7
Oxen	245	2.142857	.9408751	0	6

Source: Survey result, 2017

Table 4. Crops produced in study area.

Crop type	Number of producers	Percent (%)
Teff	194	79.18
Wheat	155	63.27
Barley	78	31.84
Check pea	140	57.14
Lentil	130	53.06
Field pea	98	40
Tomato	121	48.39
Cabbage	90	36.73
Carrot	60	24.49
Beetroot	113	46.12
Onion	245	100

Source: Survey result, 2017.

Source of income

The respondents depend on different means of income generation strategies where cereal crops, vegetables production and livestock rearing were the major sources of income for the majority of the producers in *Sebeta Hawas* Woreda. Income from sales of livestock like cow, sheep and goat and bull were 23000, 8000 and 7500 birrs respectively. Sales of chicken and donkey generated about 1500 birr each (Annex 7). Similarly, respondents stated that they incurred minimum 1800 and maximum 72000 birr from non-farm per year (Annex 8).

Major crop produced in study area

In *Sebeta Hawas woreda*, different types of cereal crop and vegetables are grown with different intensities in terms of land and other input allocation, purpose of production and marketability. The survey results revealed that most commonly grown crops in terms of the number of sampled growers are *teff* (79.18 %), wheat (63.27 %), barley (31.84 %), chickpea (57.14 %), lentil (53.06 %), field pea (40 %), tomato (48.39 %), beetroot (46.12 %) cabbage (36.73 %) and carrot (24.49 %) (Table 4).

Income from off/non-farm

About 78.78% of the respondents indicated that farming is their only source of income. The main farming in the area was cereals, vegetables, livestock rearing and other crops. From sampled households, 21.22% in addition to farming they participate in different off/non-farm income activities such as petty trading, labor, selling fire wood, employment and transport services using donkey carts to earn additional income (table 5).

Table 5. Source of livelihood from off/non-farm.

Source of livelihood from off/non-farm	Frequency	Percent
Yes	52	21.22
No	193	78.78
Total	245	100

As indicated in table 6, out of 21.22 % respondents, about 23.08 % and 19.23 % participate in petty trade and daily work as labor respectively. About 21.15 %, 15.38 %, 13.46 % and 7.69 % of the sample earned income from employment, transportation services (cart driving), Petty trade and transportation and Fire wood respectively.

Table 6. Off/non-income activities.

Off/nonfarm activities	Number of respondent engaged in off farm (N= 52)	
	Frequency	Percent
Labor	10	19.23
Petty trade	12	23.08
Transportation services	8	15.38
Petty trade and transportation	7	13.46
Fire wood	4	7.69
Employment	11	21.15

Source: Own consumption (2017)

Table 7. Land holding and allocation to onion in hectare.

Variables	N	Mean	Std. Dev.	Min	Max
Total land	245	2.8	1.007883	0.5	7
Cultivated land	245	2.3	0.874885	0.48	5.5
Area allocated for onion	245	0.6	0.18911	0.25	1.5
Homestead	245	0.4	0.122105	0	0.5

Sources: Survey result, 2017

Farm characteristics

Land holding

Land is perhaps the most important factor of production. The survey result indicated that the average land holding of the sample households was 2.8 hectare. The maximum and the minimum holding sizes were 7.0 and 0.5 hectares, respectively.

The result showed that from the total average land size of 2.8 hectare owned by a producer on average 2.3 hectare of land were cultivated and an average of 0.43 hectares were allotted for homestead. The maximum and the minimum land sizes allocated for onion were 1.5 and 0.25 hectares, respectively. The result showed that from the total cultivated land an average of 0.56 hectares were allocated for onion production (table 7).

Number of oxen and livestock

Since those who own more livestock would be in a position to undertake farm activities on time and when required, livestock are the most important source of transaction in the study area. As one can see from Table 8, around 73.06 % of the total sampled households had about two oxen. As the study was carried out in a highland area, there are different livestock species found in the area mainly cattle, sheep, donkey, horse, and poultry. Livestock is kept for generating income, and also there are some households who kept their livestock for wealth purposes. To assess the livestock holding of each household, the tropical livestock unit (TLU) per household was calculated and an average livestock holding of sample households was 5.357 % in TLU.

Table 8. Frequency of respondents by the number of oxen owned.

	Frequency		Percent	Std. Dev
Oxen owned by household	0	16	6.53	
	1	8	3.27	0.941
	2	179	73.06	
	3	12	4.9	
	4	28	11.43	
	5	1	0.41	
	6	1	0.41	
	Total	245	100	
TLU				2.54

Sources: Survey result, 2017

Onion produced

The amount of onion produced by sample producers measured in quintals produced. The result of study shows that the total amount onions produced by sample respondents were 16,917.75 quintals. The maximum and the minimum onion produced by individual were 170 and 17quintal with the average of 125 qt/ha respectively.

Table 9. Amount of onion produced by sample respondent (qt).

Variable	Obs	Mean	Std. Dev.	Min	Max
Onion produced	245	69	22.95	17	170

The onion value chain in *Sebeta Hawwas* begins with the input supply. Inputs used by farmers were onion seed, fertilizer (DA, Urea and organic) and chemicals (pesticide, fungicide and herbicides). The majority of the sampled farmers (83.67 %) stated their main source of onion seed and fertilizer as primary cooperative, followed by market (9.8 %). About 6.53% were got these inputs from agricultural offices (Fig. 3). Discussions with the farmers pointed out that there is n active cooperative in *Sebeta Hawas*.

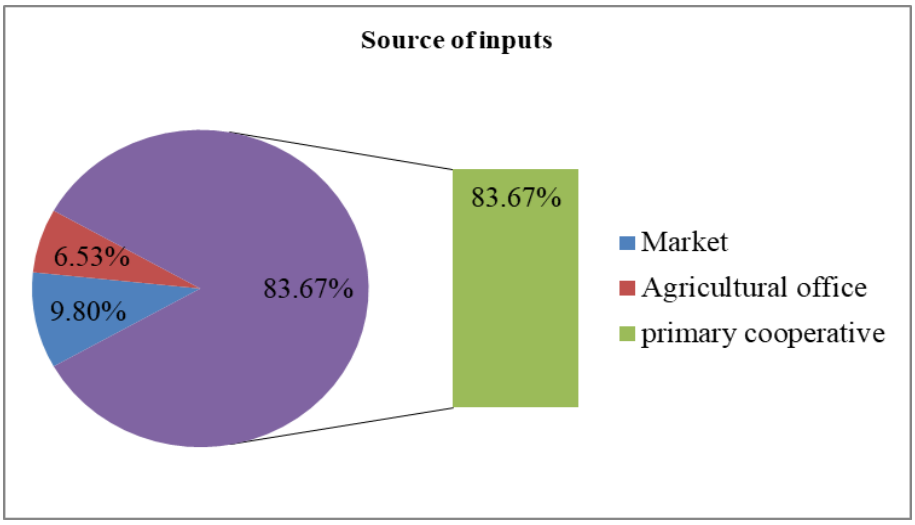

Figure 3. Source of input.

Source: Own sketch from survey

Labor is a cross-cutting constraint associated with the high labor requirement of onion production. The study depicted that about 49.39 % were used family labor for onion production in the study area. From the results about 37.55 % and 13.06 % were use labor exchange and hiring labor respectively for onion production (fig.4).

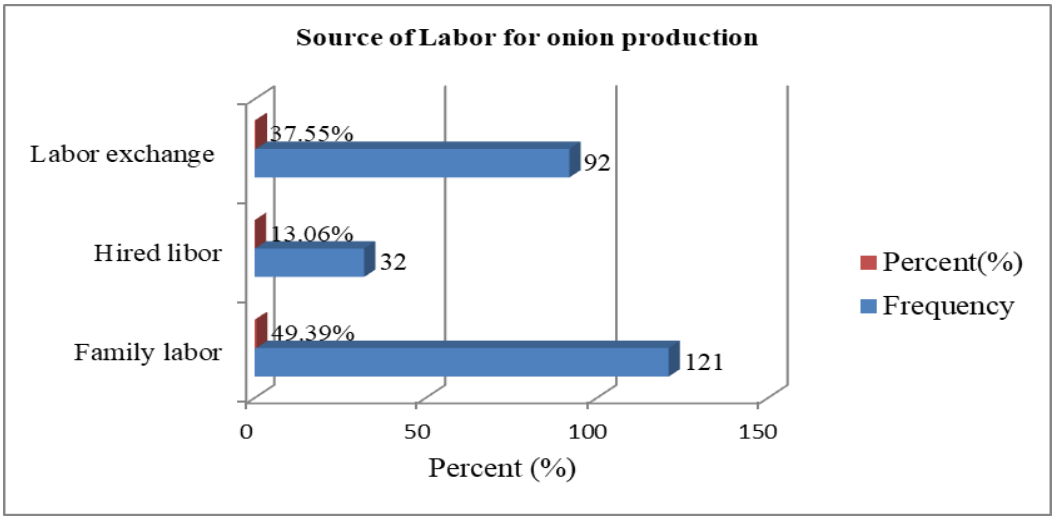

Figure 4. Sources of labor for onion production.

Source: own sketch from survey, 2017

According to the results, 62.45 % of onion producers of *Sebeta Hawas* were sells their products to wholesalers. About 25.31 %, 6.53%, 4.08 and 1.63 % were sells to assemblers, retailers and consumers respectively (fig.5).

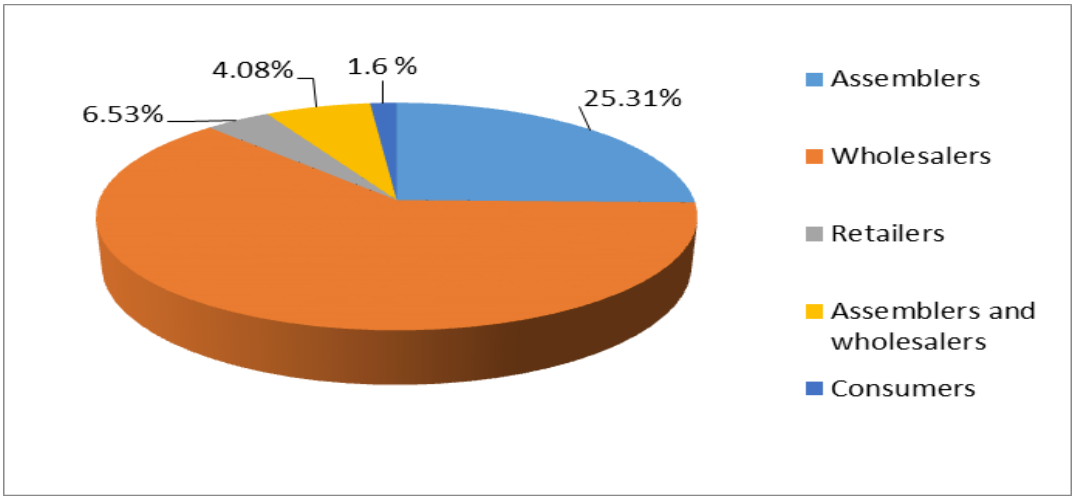

Figure 5. The flow of products from producers.

Source: own sketch from survey

Access to irrigation

In *Sebeta Hawas* woreda vegetables are produced based on irrigation and small number of farmers indicated that they had used rain fed system. From sampled producers, about 63.67 % are engaged in onion and other vegetable production using irrigation and remaining 36.33 % produced vegetable under rain fed. Water for the irrigated agriculture is fundamental resource otherwise it could not be possible to cultivate onion and other vegetables. Hawash and Abba Samuel River are the major source of water for sampled respondents. The survey results depicted that, about 91.84 % of sampled households‟ access irrigated water from River while about 8.16 % of irrigated waters comes from ground/pond water. From the sampled farmers 76.86 % of them owned motor pumps and the rest 23.14 % of them rented or farmed in partnership with those who have motors and pumps (Table 10).

Table 10. Source of water, Access to irrigation and owner of pump.

	Variables	Percent
Owner of pump	Own water pump	76.86 %
	Rent water pump	23.14 %
Access Irrigation	Yes	63.67 %
	No	33.33 %
Source water	River	91.84 %
	Ground/ pond	8.16 %

Sources: Survey result, 2017

Access to extension services

Extension service in *Sebeta Hawas Woreda* is fully provided by *Woreda* agricultural line departments. There are three Development Agents (DAs) assigned for each PA in the *Woreda*. Three DAs institutionally assigned to work in crop production, animal science and natural resources per each PA. However, the extension service is less imparted on vegetable production to impact on production task. The assessment on extension services further highlighted that, learning and knowledge imparting has need to be strengthened further in order to support households to participate in the market chain. Respondents reported that the frequency of extension visits they had from development agents was that from all respondents, 37.96 % were visited once in a week, 34.29 % any time required, 17.55 % once in a month, 8.16 % once in a year and 2.04 % were not visited at all.

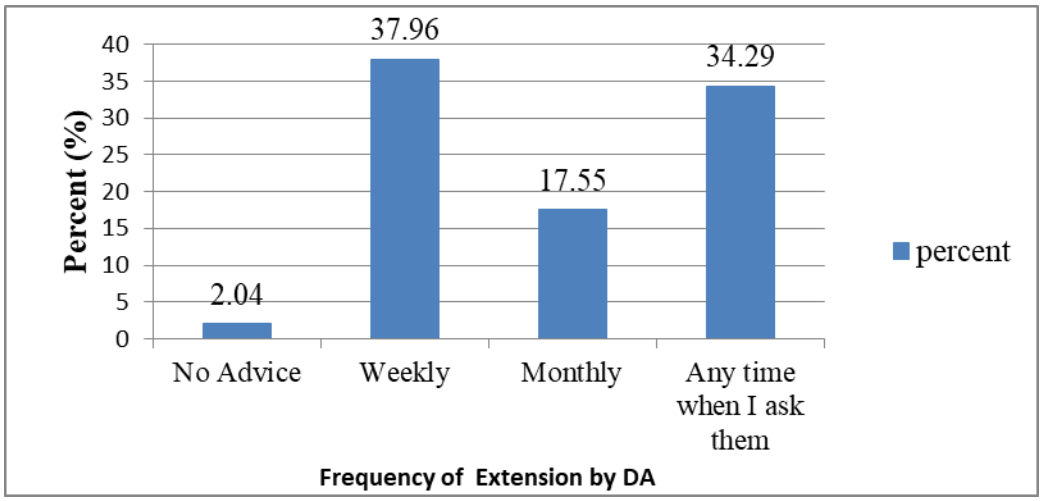

Figure 6. Frequency of extension services.

Source: own sketch from survey

As it is indicated on table 11 the advice of extension expert on onion production focuses on fertilizer application, seed bed preparation chemical application, transplanting post-harvest handling and spacing were 92.24 %, 90.61 %, 89.39 %, 88.16 % 86.53 % and 81.63 % respectively, while 7.76 %, 9.39 %, 11.84 %, 13.47 % and 18.37 % were not get advice on fertilizer application, seed bed preparation chemical application, transplanting post-harvest handling and spacing respectively.

Table 11. Types of Extension.

Types of extension Advice	N		Percent (%)	
	Yes	No	Yes	No
Seed bed preparation	222	23	90.61	9.39
Spacing	200	45	81.63	18.37
Post-harvest handling	212	33	86.53	13.47
Transplanting	216	29	88.16	11.84
Fertilizer application	226	19	92.24	7.76
Chemical application	219	26	89.39	10.61

Sources: Survey result, 2017

Access to credit

Credit is an important institutional service to finance poor farmers for input purchase and ultimately to increase their income via productivity enhancement. However, few farmers have access to credit while others may not have in the study area. The survey result indicated that only 3.27 % of the respondent had access to credit, while 96.73 % were not access to credit in cropping season of 2016/17 (table 12).

Table 12. Access to credit.

Access to credit	Frequency	Percent
Yes	8	3.27
No	237	96.73
Total	**245**	**100**

Sources: Survey result, 2017

Owning means of transport

The availability of well-functioning transport network is very important because it creates place utilities of the product. According to the survey result, about 69.80 % of households have their own means of transport and about 30.20 % have no own means of transport. Moreover, the results revealed that the main means of transport were transport animals, vehicles and cart.

Table 13. Access to own means of transport.

Access to own transport facility	Frequency	Percent
No	74	30.2
Yes	171	69.8
Total	**245**	**100**

Sources: Survey result, 2017

Access to market information

The sampled respondents revealed that the major source of market information were market, brokers, and DAs. About 55.51 % of the onion producers have got market information from market through personal observation. About 31.84 %, 10.20 % and 1.45 % of onion producers have got market information from brokers, brokers and market, and DAs respectively (Table 14).

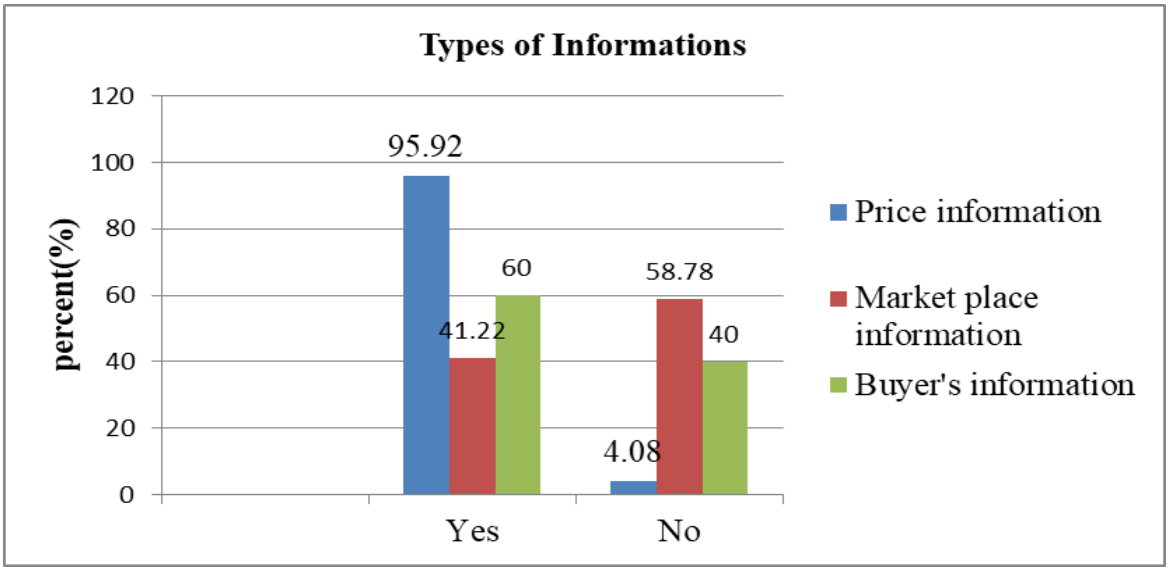

Figure 7. Types of information.

Source: own sketch from survey

Table 14. Source of market information.

Source of market information	Numbers	Percent
Das	6	2.45
Market	136	55.51
Brokers	78	31.84
Brokers and market	25	10.2
Total	**245**	**100**

Sources: Survey result, 2017

According to the survey result about 95.92 % of the respondents got price information, while 4.04 % did not get price information. About 41.22 % and 60 % had access to market place and buyer as source of information respectively. In opposite side 58.78 % and 40 % of respondent were not access to market place and buyer information respectively (Figure 7).

Demographic Characteristics of Traders

The survey result indicates that about 53.23 % of the sampled traders were female and 46.77 % were males. About 80 % and 20 % of the wholesalers were male and female respectively. For the retailers, the result depicted that about 20 % and 80 % of the retailers were male and female respectively. The result of sampled assembler shows that 53.13 % were male and 46.88 % were female.

Table 15. Sex of sampled traders.

Sex of Traders	Main Occupation of Traders			
	Wholesalers	Retailers	Collectors/Assemblers	Percent (%)
Female	2 (20 %)	16 (80)	15 (46.88)	53.23
Male	8 (80 %)	4 (20)	17 (53.13)	46.77
Total	10	20	32	100

Source: survey result, 2017

Table 16. Demographic characteristics of traders.

Variables	Observation	Mean	Std. Dev.	Min	Max
Age (in years)	62	41.55	7.19	28	54
Education level (Years in school)	62	5.48	1.97	2	10
Family size	62	3.15	1.02	2	6
Distance (Km)	62	4.16	6.73	0.5	30
Experience (in Years)	62	5.39	2.52	1	12
Description	**Number of Sampled Trades (N=62)**			**Percentages (%)**	
Marital status					
Married	56			91.32	
Divorced	4			6.45	
Widows	2			3.23	
Ethnicity of Traders|					
Amhara	9			14.52	
Oromo	25			40.32	
Gurage	26			41.94	
Tigre	2			3.23	
Main Occupation of Trades					
Wholesaler	10			16.13	
Retailer	20			32.26	
Village collectors	32			51.61	

Sources: Survey result, 2017

The survey result indicates that the sampled traders were on average 41.55 years old and had an average of 5.39 years of experience (minimum 1 and maximum 12 years). Education levels of traders were on average 5.48 years in school (minimum 2 and maximum 10 years).

The average family size of all sample traders was 3.15. The distance from trader's to from working places was on average 4.16 km (minimum 0.5 km to 30 km) with the standard error of 6.73. The marital status of traders also depicts that 90.32 % of traders were married. About 6.45 % and 3.23 % of traders were divorced and widows respectively. The ethnicity of sample traders shows that 41.94 % traders were Gurage. About 40.32 %, 14.52 % and 3.23 % were Oromo, Amhara and Tigre respectively. Table xx summarizes the demographic characteristics of traders.

The survey depicted that 100 % of wholesalers were active only in April to May in the study area. According to the respondent, the effective months of trading for retailers about 85 % were from March to June. As indicated in table xx about 93.75 % of assemblers were active from March to June and out of 93.75 % about 75 % of collectors were effective in April and May.

Table 17. Effective month of onion trading.

Effective Month of trading	Wholesalers	Retailers	Assemblers/Collectors
January			
February		1	1
March		3	3
April	4	3	11
May	6	8	13
June		3	3
July		1	
August			
September			
October		1	1
Total	10	20	32

Source: Survey result, 2017

Actors and their role in Onion Value Chain

Input Suppliers

At this stage of the value chain, there are many actors who are involved directly or indirectly in agricultural input supply in the study area. Currently WOA, primary cooperatives/ union and private input suppliers are the main source of input supply. All such actors are responsible to supply agricultural inputs like improved seed varieties, fertilizers, herbicides, pesticides and farm implements which are essential inputs at the production stage. Regarding fertilizers, some farmers used only organic fertilizer (manure and compost) while some farmers used both inorganic and organic fertilizers depending on the land size allocated to vegetable, vegetable type produced and the soil fertility status as perceived by the farmers (KII). Pesticides are supplied mostly by private vendors. Development agents are playing facilitation role in collecting farmers input requirement and submitting it to the WOA. They also play the same role during input distribution. Most of the time in the study *woreda* input suppliers are primary cooperatives (83.67 %) who disseminate suitable seed varieties to expand and promote the development of new onion varieties.

Producer: These are first link actors of the market channel who cultivate and supply surplus onion, to the market. Since the products are very perishable in nature right after harvest they sold either at farm gate and/or *woreda* market. The study revealed that 71.43 % of onion producers sell at farm gate. The remaining, 8.98 % and 19.59 % of onion producer sold at local market and *woreda* (*Sebeta*) market respectively. The study shows that 55.92 % of the sample households use vehicle (Isuzu), 27.35 % use back animal, 15.51 % uses animal carts and the rest 1.22 % use head/backload.

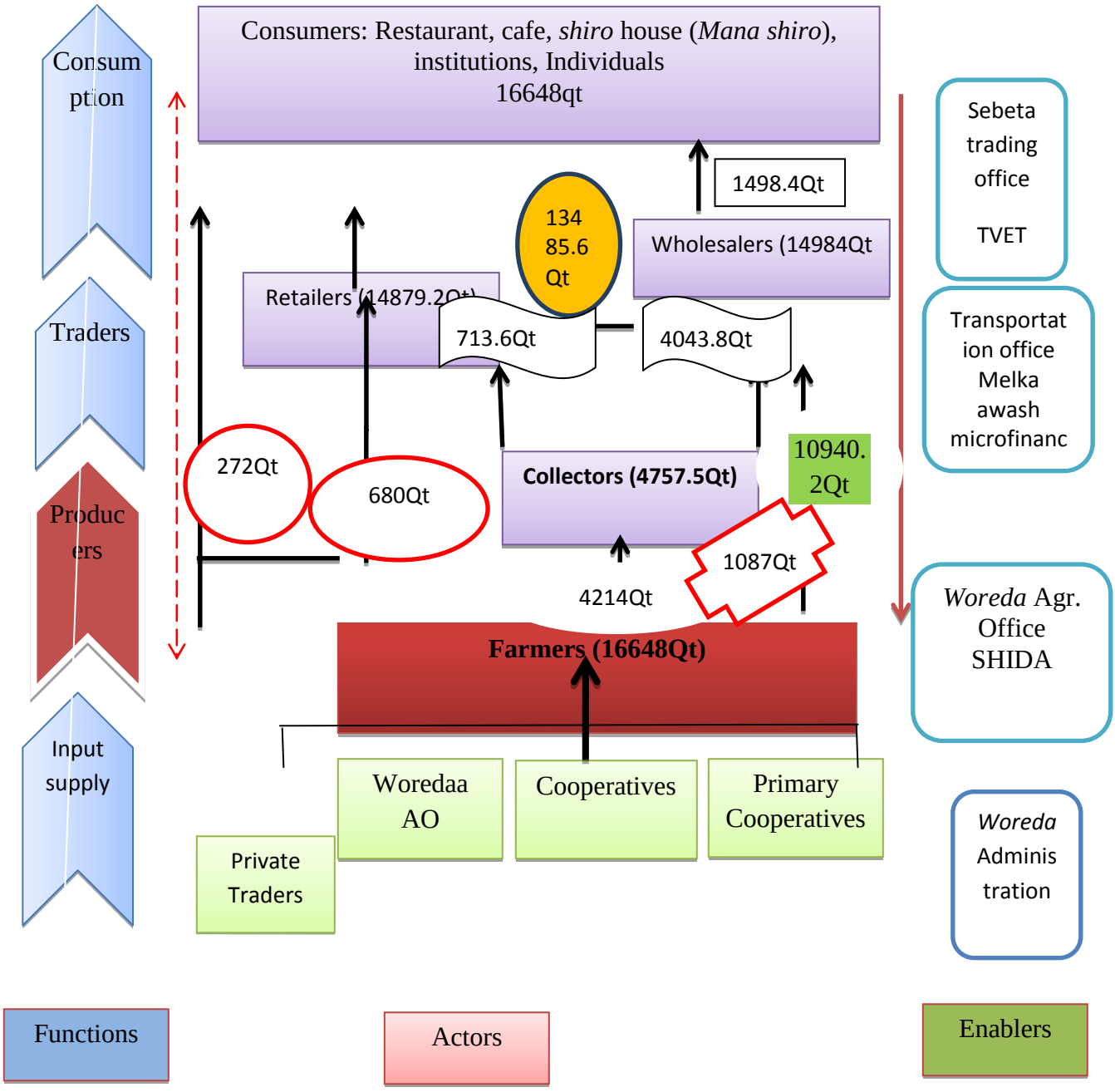

Figure 8. Map of onion Value chain in *Sebeta Hawas*.

Collectors: Collectors are those who know the local language and the potential areas where onions are produced. Once the required quantities have been gathered, the assemblers/collectors contact the wholesaler found in Addis Ababa, *Sebeta* and *Waliso*. After large volume sold to wholesalers the remaining about 15 % were sold to retailers of the *woreda*.

Brokers: Brokers in *Sebeta Hawas* have regular and temporary customers from Addis Ababa, *Waliso* and *Jimma*. Brokers assist transaction by convincing farmers to sale his onion and other vegetables and facilitating the process of penetrating good quality and quantity onions to wholesalers. The share of profit that goes to brokers based on the volume/quantity sold. From the result of survey 2 % of sales were common from two parties. The secret behind 2% brokers go for more benefit by symmetry information specially reducing selling price.

Wholesalers: These are known for purchase of bulky products with better financial and information capacity. Survey result shows that from ten (10) wholesalers intervened about 80% were male and the rest 20 % were female. They buy onion at the farm gate and from assemblers/local collectors with a larger volume than any other marketing actors do. They relatively spend their full time in wholesale buying throughout the year in and out of the *woreda*. Each wholesaler uses Isuzu trucks as a transportation vehicle; if the amount of onion supplied to the market is large. Otherwise, they purchase other vegetable crops like cabbage, beetroot and tomato together with onion to fill the truck. The role of brokers was inclined towards buyers. Wholesalers usually get information from friends in Addis Ababa, *Sebeta*, *Waliso* and *Jimma* and set the daily price.

Retailers- These are the final link in the chain that delivered onion to consumers. They are very numerous as compared to wholesalers and rural assemblers and their function were to sell to consumer in pieces after receiving larger volumes from wholesalers, rural assemblers or producers. A total of 20 retailers interviewed out of which four were male and 16 were females. The majority (85 %) were able to read and write. The survey result revealed that their years of experience were about a minimum of 2 and a maximum of 12 years of working experience. All the respondents in the study area were licensed to sell/handle onion with other vegetables and fruits. The working capital of retailers ranged from 5,000 up to 80,000 birr.

Processors: Processing of onion in the sense of preserving and value addition is not as such practiced in the study areas. From the survey result all of intervened processor (10) organized as small and medium enterprise (SME) in *woreda* were not use onion in making of *baltina* and *berbere.* They mentioned that in making *baltina* and *berbere* their preference is to use ginger, garlic, chick peas, broad bean and chill peppers. Processing function is undertaken by individual house consumption, *shiro bet*, hotels or restaurants in which case fresh and cooked vegetables are sold to consumers. Onion is commonly consumed in the form of cooked meals in different traditional *dishes* or "*wat*". Even though onion is common used in daily dishes; in the study area onion processing were not known further more.

Onion consumers

Consumers are those purchasing the products for consumption. Onion consumers are individual households (rural and urban dwellers) hotels and institutions. Onion is stable vegetable in daily dishes. The survey indicated that out of 20 consumers interviewed on average individual household consumption were 5.67 kg per week. About 14 kg and 291 kg were consumed by *shiro bet* and hotels respectively.

Table 18. Amount of onion consumed by sampled per week.

Consumers	Respondents (20)	Average consumption (Kg/week)
Individual House hold	9	5.67
Shiro bet/cafe	8	14
Hotels	3	291

Source: Survey result, 2017

Supporters and their roles

In a value chain, supporters include all chain-specific actors providing regular support services or representing the common interest of the value chain actors. The supporting function players for the onion value chain are those who are not directly related to the onion value chain but provide different supports to the value chain actors. The support functions include different services (e.g. credit), research and development, infrastructure, and information. Support service providers are essential for value chain development and include sector specific input and equipment providers, financial services, extension service, and market information access and dissemination, technology suppliers, advisory service, etc.

In the study areas, there are many institutions supporting the onions value chain in one way or another. The most common support providers are *Sebeta Hawas* Agriculture Office, *Sebeta Hawas* Irrigation and Development Authority, *Sebeta Hawas* Trade and Market Development Office, Cooperatives, Oromia Micro Finance Institutions, Private transporters, *Sebeta* TVET College and *Melkasa* Agricultural Research Center. Some service providers extend services beyond one function and others are limited to a specific function.

Sebeta Hawas Irrigation and Development Authority and Agricultural Development Office provide agricultural extension services to producers through experts and development agents. The office provides technical support, facilitate access to inputs. According to group discussion, producers get technical support in seed bed preparation, fertilizer application, time of planting, crop protection strategies and post-harvest handling. The key informant's interview indicated that the producers get extension service on general agriculture and it is not sufficient to improve the technical skill of the producers. Retailers of *Sebeta* town organized as SME get loan from Oromia Micro Finance Institutions and relatives/friends. The key informant's interview points out that at least SME should save 20% of the requested budget to get the loan (KII). Moreover, it was found that NGOs operating in providing technical service and offers seed support to the poor farmers. In the study areas, primary cooperatives collaborate with *Meki* cooperatives supply onion seed and fertilizer for producers. This is not sufficient to address interest of farmer. According to FGD, the problems of water polluted in Ilamu kebele were not addressed by woreda administrative. They mentioned that those educated expert, at woreda level were not consider the as problem. Concerning to this issue was asked the key informant interview (KII) and their responses were not addressed by woreda capacity. The major actors involved in onion value chain include input suppliers, producers, rural collectors, wholesalers, retailers and consumers. Most producers sell their products to the traders while some of them sale for consumers. However, it is also found that wholesalers, retailers and collectors directly purchase the onion from the farmers. The study results indicate that the wholesalers assisted by the brokers are the main onion value chain governors. The producers' position in price negotiation and product quality definition was good in the study area. Few of farmers in study area mentioned that producers were price taker for onion harvested after half month of May and June. This is because of lack transportation in raining time. About 78.78 % of respondents were set price of selling by negotiation. Similarly, about 7.76 %, 5.72 % and 7.76 % were set selling price by themselves, buyers and demand and supply.

Table 19. Costs of onion production.

Production cost Item	Cost (Birr per quintal)	Share (%)
Land value (Birr)	43.50	18.35
Input cost fertilizer/chemical (Birr)	72.51	30.59
Labor cost (Birr)	29.00	12.23
Purchased seed cost (Birr)	14.50	6.12
Oxen/tractor/traction cost (Birr)	12.55	5.29
Weeding cost (Birr)	7	2.95
Harvesting cost (Birr)	8	3.37
Irrigation cost (Birr)	30	12.65
Cleaning/separation cost (Birr)	20	8.44
Total cost of production	**237.07**	

Source: Survey result, 2017

Value chain map of onion in the study area

Mapping a value chain facilitates a clear understanding of the sequence of activities and the key actors and relationships involved in the value chain. Mapping of value chain functions is considered to show the relationships and integrations of the processes and activities performed along the value chain. Major functions include input supply, production, trading, processing and consumption. Figure 8 displays the functions or processes in onion value chain map.

Analysis of Benefit Share of Onion Actors

Costs of onion production

Onion producing farmers of the study area incur costs mostly during the production phase more than during marketing their produce. They incur production cost of 237.07 birr per quintal. The estimated land value and labor cost is opportunity cost of land which is rental value of land and labor value is hiring value of labor in the study area. Furthermore, in the study area, onion is produced using family labor and hired labor. The largest cost item in the study area were input and land value cost which accounts for 30.59 % and 18.35 % of total cost of production respectively (Table 19).

Onion marketing

The analysis of marketing channels was intended to provide a systematic knowledge of the flow of goods and services from its origin, producer, to final destination, consumers. The estimated volume of production of onion was about 16894.75 quintals about 16648 quintals of onion were sold.

The study identified five onion marketing channels. The amount of onion transacted in these market channels was different and out of the five, two market channels were found to be dominant in terms of onion volume of transaction. Marketing channel I starts from producers and end with consumer. This channel was the least dominant one as they estimated for supply of 1.63 % of the total onion supplied. Marketing channel II starts from producers, retailers and ends with final consumer. In this market channel about 680 quintals of onion (4.08 %) was supplied. Channel III involves producers, brokers, retailers and consumers. It was found to be the third dominant one in terms of volume of onion supply. In this market channel about 714 quintals of onion (4.29 %) of the total onion was supplied. Marketing channel IV was the most dominant one, about 13485.6 quintals of onion (81 %) supplied in this channel. The participants of this market channel include producers, brokers, wholesalers, retailers and consumers. Channel V supply 9 % of onion hotels and *sebeta* TTC college. The channels contain producers, collectors (assemblers), wholesalers, and consumers. Marketing channel V was the second dominant one as they accounted for the supply of 9 % of total onion supplied through this channel.

Onion marketing channel of *Sebeta Hawas Woreda*

Channel I: Producers ⟶ Consumers 272qt (1.63 %)

Channel II: Producers ⟶ Retailers ⟶ Consumers 680qt (4.08%)

Channel III: Producers ⟶ Collectors ⟶ Retailers ⟶ Consumers 714qt (4.29%)

Channel IV: Producers ⟶ Collectors ⟶ Wholesalers ⟶ Retailers ⟶ Consumers 13485.6qt (81%)

Channel V: Producers ⟶ Collectors ⟶ Wholesalers ⟶ Consumers 1498.4qt (9%)

The study shows that collectors/farm-gate price of onion was Birr 429.35 per quintal, while wholesaler and retailer price were Birr 540 and 680 per quintal.

Econometric Results

Factors affecting onion market supply

Prior to the use of the multiple linear regression model to analyze the determinants of quantity supplied to the market in the study area, multicollinearity problems were checked using variance inflation factor (VIF) and the result indicated that the continuous explanatory variables included in the model were not substantially correlated with each other. The results indicated that there was no serious problem of multicollinearity because the result of VIF is less than 10 for all variables (Appendix 2).

The problem of heteroscedasticity is always common and expected when analyzing cross-sectional data (Gujarati, 2003). In this study, STATA (Breusch-pagan) test was used to check for heteroscedasticity and the result showed that p-value of 0.0742 (Appendices 4). The heteroscedasticity problem was found. After the appropriate tests, to solve heteroscedasticity problem, the Robust regressions was run and analyzed using ten explanatory variables and the result showed that five explanatory variables (Sex, age, quantity of onion produced, Access to irrigation and access to own transportation) are found to significantly determine the variability in the households' marketed surplus at 1 % and 10 % significance level (Table 21).

Table 20. Estimated marketing margin of onion value chain actors.

Cost of item	Producers	Assembler/ collectors	Wholesalers	Retailers
Production cost	237.07(78.0)	0.00	0.00	0
Cost of transportation	15.74 (5.18)	18.46 (23.53)	20 (22.10)	18.46 (26.01)
Sack cost	9 (2.96)	9 (11.47)	8.8 (9.72)	9 (12.68)
Loading/unloading cost	10 (3.29)	10 (12.75)	10 (11.05)	10 (14.09)
Storage cost	5 (1.65)	5 (6.37)	6 (6.63)	6 (8.46)
Sorting cost	7 (2.30)	3 (3.82)	2.5 (2.76)	2 (2.82)
Sales tax	2 (0.60)	5 (6.37)	8 (8.84)	7 (9.86)
Personal expense	5 (1.65)	10 (12.75)	12 (13.26)	7 (9.86)
Brokerage	4.3 (1.41)	9.7 (12.36)	12.2(13.48)	2 (2.82)
Wage	7 (2.30)	6 (7.65)	8 (8.84)	7 (9.86)
Telephone	1.8 (0.59)	2.3 (2.93)	3 (3.31)	2.5 (3.52)
Total Cost Birr/qt	303.91	78.46	90.50	70.96
Average selling price/qt	429.35			
Average purchasing price/qt		429.35	540	680
Total Cost Birr/qt		507.81	630.50	750.96
Average selling price/qt		540	680	800
Gross profit	58.60	32.19	49.50	49.04
TGMM (%)	30.95	17	26.14	25.90

Note: The value in the parenthesis indicate percentage share of marketing cost from total marketing cost.
Source: Own computation based on survey data of (2017)

Table 21. Determinants of quantity of market supply of onion.

Quantity supplied	Robust			
	Coef.	Std. Err.	t	P>t
Sex	0.103861	0.05946	2.01	0.082*
Age of the household head	-0.00535	0.002969	-1.99	0.073*
Distance	-0.00089	0.004123	-0.36	0.83
Oxen	0.016214	0.028127	0.66	0.565
AEU	0.000131	0.021425	-0.08	0.995
Own transportation	0.106061	0.057923	1.98	0.068*
Frequency of extension	0. 001126	0.012131	0.07	0.940
Irrigation	0.094863	0.053111	1.41	0.075*
Education	0.002016	0.007916	0.35	0.799
Amount of onion produced	0.998566	0.001315	653.52	0.000**
_cons	-0.88818	0.149584	-4.74	0.000
Number of obs	245			
F(10, 234)	= .			
Prob > F	0.000**			
R-squared	0.83.222			
Root MSE	0.41.146			

Note: Dependent variable is quantity of onion supplied to market in quintal in 2016.
** and * are Significant at 1% and 10% level of probability, respectively.
Source: Own computation from survey result, 2017.

Test of endogeneity: Endogeneity problem exists when an independent variable in the model is explained by other variables included within the equation. The p-value of Durbin-Wu-Hausman chi-square was 0.6220 (Appendix 5). The test result indicated that there was no problem of endogeneity in the model.

Table 20 shows that producers get higher profit, which was birr 58.60 per quintal followed by wholesalers and retailers, which is about 49 birr per quintal. The study indicated that the total gross marketing margin (TGMM) was the highest at producers, which was about 30.95 %. Assemblers get the lowest TGMM which was 17 %. Total gross marketing margin of wholesalers and retailers were about 26.14 % and 25.90 % respectively.

As depicted in Table 21, the model was statistically significant at 1% and 10% probability level indicating the goodness of fit of the model to explain the relationships of the hypothesized variables. Coefficient of multiple determinations (R^2) and Ovtest were used to check goodness of fit for the regression model. Hence, R^2 and Ovtest indicate that 83.222 % and 59.01 % of the variation in the quantity of onion supplied to market was explained by the variables included in the model respectively. The explanation on the effect of the significant explanatory variables is discussed below.

Sex of House Hold Head (Sex)

This variable was found to be positive and statistically significant influence on onion volume supply to market at 10 % level of significance. The positive indication shows being a male head of a household significantly increases onion quantity supplied to market by 0.1038 quintals as compared to that of female-headed households, keeping other variables constant. The basis behind male headed households supplied more onion to market than female headed households, is that females can take higher care than males about household consumption by saving from produce to feed household; this can reduce the quantity to be sold. This is line with the finding of Addisu (2016) who found that male household head positively and significantly influenced potato marketed supply of potato. The authors stated as the reason that female headed households can take higher care than males about household consumption by saving from produce to feed household.

Age of Household Head

Age of the household, a continuous variable, was taken as one of the explanatory variables to influence supply to market. The result indicated that negative coefficient and significant at 10% level of significance. The negative coefficient indicates that as an age increase a year the amount of onion supply to market decrease by 0.00535 quintal

Amount of Onion Produced: The coefficient of onion produced shows a significant positive effect at 1 % highly significance level on marketed surplus of onion. The coefficient for productivity of onion implies that an increase in productivity of onion by one quintal per hectare resulted in an increase in farm level marketed surplus of onion by 0.998 quintals, keeping another factors constant. A study conducted by Debela, 2013 indicates that additional kg of onion production led to increase in the probability of quantity supplied by 0.929 Kg. Other studies by Addisu (2016) on value chain analysis of vegetables in Ejere *woreda* indicated that increase in productivity of potato by one quintal per hectare resulted in an increase in farm level marketed surplus of potato by 0.270 quintals. In the same way the study by Mahlet et al. (2015) specified that potato quantity produced affects marketed supply of potato positively and significantly.

Access to irrigation (Irrigation): This variable was hypothesized to have positive influence on onion supply to market. Yet, the result showed that farmers who have access to irrigation are using irrigable land for the production of onion and vegetables crops. It was also found out that irrigation water supply requires investment in pumping water and fuel is crucial factor determining the type of crop farmers produce. The variable was found to be positive and statistically significant influence on onion volume supply to market at 10% level of significance. A study conducted by Tadese (2012) showed that farmers who have access to irrigation are using irrigable land for the production of high value cash crops have positive influence on vegetable supply to market.

Access to own transportation (Otran): Ownership of transportation had a positive and significant influence on delivery of product to market at 10 % probability level. The positive sign shows that farmers who have own transportation is more likely to sell onion to consumer and retailer nearest market compared to those farmers who had not. This may imply that farmers who had own transportation for transport produce more onion and thus deliver their product to market compared to those farmers who had not. Those who had not own transportation was looking for assemblers and wholesalers to sell their products.

Challenges and opportunity of onion production and marketing

During focus group discussion and key informant survey the majority of the respondent answered onion production and marketing in study area constrained by so many factors that, market information, skill gap, limited financial access, poor linkage among actors, transport facility, incidence of diseases problems that affect their onion production, climatic variations, drought problem of market for their production, lack of transportation facilities and lack of all-weather road are the major constraints of onion production.

Table 22. Major constrain in onion value chain at production and marketing.

Constrain	Mean rank	Rank
Management related problems	1.29	1st
Market related problems	3.40	2nd
Lack of farm land	4.41	3rd
Lack of improved Varity	5.54	4th
Lack of credit services	6.11	5th
Lack of transportation services	6.96	6th
Frequency of extinction contact	7.26	7th
Seasonal rainy scarcity problem	8.09	8th
shortage of farm land	9.76	9th
Drought related problem	10.63	10th
Low accessibility of transportation	12.56	11th
No as such problems	13.96	12th
Disease and pest related problems	14.64	13th
Total	**100%**	**13**

N 245, Kendall's Wa 0.807, chi square 1552.645, Df 13, aspm sigtuer 0.000

Source: Computed from Field Survey Data (2017).

Challenges

The onion value chain itself as well as the chain actors in the study areas have been facing so many challenges. Major challenges of the chain are inefficient use of existing potential of the this sector, absence of coordination among the actors for essential value chain activities such as value addition and value chain governance, weak support service providing trend, shortage of qualified onion value chain professionals to support the chain technically as well as intellectually. On the other hand, the onion value chain actors are also facing many challenges at each stage of onion value chain less awareness about the support services provided at moderate level and lack of access for service sectors like credit and market information's, lack of coordination with other actors of the value chain. To identify list of constraints in this study, suggestions' of extension service providers and researcher's exploratory study were considered. And then respondents were asked to put the identified constraints in rank order by assuming the first rank is considered as the most important constraint. Onion producers in studied area face a series of challenges that limit their overall production and marketing income.

Opportunity

Opportunities are favourable conditions or circumstances exist for a given issue/activity that to be considered as good chance and also to be used in the coming near future and thereby to upgrade that activity. There are many opportunities for the Onion value chain to be improved in the study areas and thereby to benefit all the chain actors along the chain primarily and then to play the role by putting finger prints on the economic development activities of our country. Some of opportunities for the onion value chain in the study areas are the growing populations, fast expansion of urbanization and people awareness on balance diet issue, increment in literate and economically strong generations these all together have their own contribution on the demand of onion and hence improvement on the value chain. Which were growing populations, urbanization and economic growth in developing countries are contributing to growing demand for Vegetable and its products. Therefore, all stake holders in the study areas have to play the role by contributing what is expected from them at each level so as to improve, upgrade the onion value chain and thereby to benefit from the sector.

CONCLUSION

Onions are one of the most important ingredients in the Ethiopian kitchen and used especially during fasting times, when the people who fast only eat vegetarian food. Onion (*Allium cepa* L. var. cepa) is an important vegetable crop worldwide and is ranked second among all vegetables in economic importance. In Ethiopia, the crop is believed to be more regularly consumed than any other vegetable crop. The production of these vegetables depends on natural environment, input use and combination of inputs and management practices. The major actors involved in onion value chain include input suppliers, producers, rural collectors, wholesalers, retailers and consumers. The most common support providers are *Sebeta Hawas* Agriculture Office, *Sebeta Hawas* Irrigation and Development Authority, *Sebeta Hawas* Trade and Market Development Office, Cooperatives, Oromia Micro Finance Institutions, Private transporters, *Sebeta* TVET College and *Melkasa* Agricultural Research Center. In the study areas, primary cooperatives collaborate with *Meki* cooperatives supply onion seed and fertilizer for producers. Onion producing farmers of the study area incur costs mostly during the production phase rather than during marketing their produce. They incur production cost of 237.07 birr per quintal. The largest cost item in the study area were input and land value cost which accounts for 30.59 % and 18.35 % of total cost of production respectively. The estimated volume of production of onion was about 16894.75 quintals about 16648 quintals of onion were sold. The study identified five onion marketing channels. Marketing channel IV was the most dominant one, about 13485.6 quintals of onion (81 %) supplied in this channel. The result shows that producers get higher profit, which was birr 58.60 per quintal followed by wholesalers 49.50 birr per quintal. Retailers and assemblers were gets 49.04 and 32.19 birr per quintal respectively. The study indicated that the total gross marketing margin (TGMM) was the highest at producers, which was about 30.95 %. Assemblers get the lowest TGMM which was 17 %. Total gross marketing margin of wholesalers and retailers were about 26.14 % and 25.90 % respectively. Multiple model was used to analyses determinants of household quantity supplied in the study area. After the appropriate tests, to solve heteroscedasticity problem, the Robust regressions was run and analyzed using ten explanatory variables and the result showed that from ten variables five explanatory variables (Sex, age, quantity of onion produced, Access to irrigation and access to own transportation) are found to significantly determine the variability in the households' marketed surplus at 1 % and 10 % significance level.

RECOMMENDATION

From the results of the study, the following policy recommendations are drawn and summarized as follows: Universities and ATVET College in collaboration with unions must arrange regular trainings on value chain for *woreda* experts and farmers. Government provides technology to the actors for value addition by processing the onion products. *Woreda* administrative should design the way of controlling brokers/ commission agents those who working as permanent and temporary in the *woreda.*

The results of econometric analysis indicate that onion supply to the market is positively and significantly affected by sex of household head, age of household head, quantity of onion produced access to own transportation facility and Access to irrigation. Therefore, these factors must be recommended in order to increase the amount of onion marketable supply.

- ✓ Strengthening efficient and area specific extension systems, improving road infrastructure, supporting DAs by giving continuous capacity building trainings and from other administrative activities increases onion supply to the market.
- ✓ Extension negatively influences onion produced and supplied to the market it needs another intervention on the future in the study area.
- ✓ The government should have to be improving transportation access to the farmers is essential to make onion market efficient in addition to developing road infrastructures.
- ✓ In addition, government should give special attention to highly perishable onions and other vegetables
- ✓ Government improve irrigation facility to increases

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APPENDICES

Appendix 1: Conversion factor of tropical livestock unit (TLU).

Livestock Category	TLU	Livestock Category	TLU
Ox /cow	1	Horse	1.1
Bull	0.75	Sheep (adult)	0.13
Weaned calf	0.34	Sheep (young)	0.06
Heifer	0.75	Goat (adult)	0.13
Calf	0.25	Goat (young)	0.35
Camel	1.25	Hen	0.013

Sources: Storck, et al., 1991

Appendix 2: Multicollinearity test for explanatory variables.

Variable	VIF	1/VIF
Oprod	2.13	0.468529
AEU	1.63	0.612874
Education	1.43	0.696951
Oxen	1.4	0.714945
Distance	1.37	0.728961
Agehh	1.37	0.732273
Irrigation	1.16	0.863117
Sex	1.13	0.884594
FreqEt	1.08	0.927172
Otran	1.06	0.939388
Mean VIF	1.38	

Sources: Own consumption

Appendix 3: Conversion factor to adult equivalent (AE).

Age group	Male	Female
<10	0.6	0.6
11-13	0.9	0.8
14-16	1	0.75
17-50	1	0.75
>50	1	0.75

Sources:

Appendix 4:Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

Ho: Constant variance
Variables: fitted values of Qntysup
chi2(1) = 3.19
Prob > chi2 = 0.0742
Source: Own consumption

Appendix 5: Tests of endogeneity.

Tests of endogeneity
Ho: variables are exogenous
Durbin (score) chi2(1) = .255974 (p = 0.6129)
Wu-Hausman F(1,233) = .243691 (p = 0.6220)

Appendix 6: Onion production constraints in study area.

Onion production constraints	Degree of respondent measure	Frequency (N)	Percent (%)
Oxen shortage	Strongly Disagree	98	40
	Disagree	42	17.14
	Neutral	68	27.76
	Agree	32	13.06
	Strongly agree	5	2.04
Insect	Strongly Disagree	8	3.27
	Disagree	0	0
	Neutral	47	19.18
	Agree	155	63.27
	Strongly agree	35	14.29
Diseases	Strongly Disagree	4	1.63
	Disagree	4	1.63
	Neutral	27	11.02
	Agree	133	54.29
	Strongly agree	77	31.43
Drought	Strongly Disagree	7	2.86
	Disagree	11	4.49
	Neutral	95	38.78
	Agree	64	26.12
	Strongly agree	68	27.76

Onion production constraints	Degree of respondent measure	Frequency (N)	Percent (%)
Weeds	Strongly Disagree	5	2.04
	Disagree	24	9.8
	Neutral	204	83.27
	Agree	7	2.86
	Strongly agree	5	2.04
Flood	Strongly Disagree	13	5.31
	Disagree	13	5.31
	Neutral	171	69.80
	Agree	48	19.59
	Strongly agree	0	0
Frost	Strongly Disagree	5	2.04
	Disagree	0	0
	Neutral	92	37.55
	Agree	140	57.14
	Strongly agree	8	3.37
seed shortage	Strongly Disagree	8	3.27
	Disagree	8	3.27

	Neutral	24	9.8
	Agree	143	58.37
	Strongly agree	62	25.31
Fertilizer	Strongly Disagree	1	0.41
	Disagree	13	5.31
	Neutral	50	20.41
	Agree	158	64.49
	Strongly agree	23	9.39
Pesticides	Strongly Disagree	1	0.41
	Disagree	13	5.32
	Neutral	10	4.08
	Agree	135	55.1
	Strongly agree	86	35.1

Source: survey result, 2017.

Appendix 7: Income from livestock.

Variable	Obs	Mean	Std. Dev.	Min	Max
Income from heifer	245	0	0	0	0
Income from calves	245	0	0	0	0
Income from bull	245	61.22449	676.2409	0	7500
Income sheep and goat	245	1749.388	2343.138	0	8000
Income from donkey	245	24.4898	190.4811	0	1500
Income from mule	245	0	0	0	0
Income from chicken	245	380.8163	370.9969	0	1500
Income from cow	245	4212.653	5049.538	0	23000

Source Survey Result, 2017

Appendix 8: Estimation of non-farm income

Annual estimated of income from non-farm	Frequency	Percent
0	193	78.78
1800	2	0.82
2000	1	0.41
2500	2	0.82
2800	3	1.22
3000	1	0.41
3500	1	0.41
4000	3	1.22
4100	3	1.22
4200	8	3.27
4300	1	0.41
5000	3	1.22
5100	5	2.04

5800	3	1.22
6000	2	0.82
6200	1	1.22
7000	3	1.22
7400	3	1.22
7800	1	0.41
7900	1	0.41
8000	1	0.41
8500	1	0.41
10000	1	0.41
72000	1	0.41
Total	245	100

Source Survey result, 2017

Appendix 9: Setting selling price strategy.

Who sets Selling prices of onion	Freq.	Percent
Yourself	19	7.76
Buyers	14	5.71
by demand and supply	19	7.76
Negotiations	193	78.78
Total	245	100

Source: survey result, 2017

Appendix 10: Interview Schedule

Questionnaire developed for Farmer's Survey

Remark: The personal profile obtained from respondents with regard to the theme will be kept confidential and will not have any consequence on the respondent in any ways. Please give correct answers to the following questions.

Instruction for Enumerators

- Start with warmly greeting farmers according to the culture of the area
- Introduce yourself, your organization (from where you come) and objective of your meeting with him.
- Tell the farmer that information collected for this study will be kept strictly confidential.
  While the data collected will be used for research purposes, information that could identify you or your household will never be publicly released in any research report or publication and will not be shared with any other government or international institution.
- Tell him also he has the right to ask questions at any point before the interview, during the interview, or after the interview is completed.
- Write important information below the page margin
- Before going to ask questions please identify ambiguous questions and be it clear for you from the survey supervisor.
  Name of *Woreda* _____
  Name of Peasant Association _____
  Name of household head (respondents name)_____
  Contact Address (Mobile Number) _____
  Enumerator name _____ Signature
  _____

Date of Interview _____

Distance of respondent residence from the nearest market place _____km

I. Respondents' general household information

1.	Sex of household head	0. Male 1. Female
2.	Age of household head ____years	
3.	Religion of household head	1. Muslim 2. Orthodox Christian 3. Protestant 4. Catholic 5. Others (specify) _
4.	Education level of household head_____	Number of years in school
5.	Marital status of household head	1. Single 2. Married 3. Divorced 4. Widows

Family size_____

Sex category	<10Years	11 to 14 Years	15 to16 years	17 to 50 years	>50 years
Male					
Female					
Total					

II. Resource ownership

Land holding and Farming characteristics

1. Total Land holding_____timad /ha
   1. Cultivated area _____timad/ ha 4. Homestead_____ timad/ha
   2. Private pasture land _____timad /ha 5. Others (specify)____timad/ha
   3 Fallow land ____timad/ha
2. What is total area of rented in land_____ ha , rented out land _____ha
3. Total area allocated for onion in 2015/2016 production year_____ha
4. Crop produced in 2015/16

No.	Types of crop	Area in *timad*	Quantity produced (qt)	Quantity consumed (qt)	For seed (qt)	Quantity sold (qt)	Price/qt
1	*Teff*						
2	Maize						
3	Wheat						
4	Sorghum						
5	Barley						
6	Chick pea						
7	Lentil						
8	Faba bean						
9	Field pea						
10	Onion						
11	Vegetables						
	Tomato						
	Potato						
	Cabbage						
12	Others(specify)						
Your cash crop relative to level of cash income 1 = primary, 2 = secondary and 3 = tertiary)				1.			
				2.			
				3.			

5. Livestock ownership

Type of livestock	Number owned in2015/16	No. of sold	Cash income from sold (Birr)
Cows			
Oxen			
Heifers			
Yearling			
Calves			
Bulls			
Sheep			
Goats			
Donkeys			
Horses			
Mules			
Poultry			
Bee colony			
Other (specify)			

III. Source of Income

Farm income

1. What are your major sources of income? Sale of crops =1 Sale of livestock and/or products =2 Off-farm income =3 Others = 4 (specify) _____
2. Estimate of annual cash income from
   a) Sale of crops _____Birr/year
   b) Sale of livestock _____Birr/year
   c) Sale of livestock products (milk, butter, egg…) _____Birr/year
   d) Off-farm income _____Birr/year e) Other sources _____Birr /year(specify)___
3. Which crops did you sale most of the time? _____ (Put in their order of importance by selecting from the following) 1. Vegetable production 2. Grain and pulse production 3. Livestock production 4. Others specify_____

Off/non-farm income

4. Do you have off/non -farm income? 1. Yes 2. No (if yes proceed to the following table)

Income source	Estimated annual Income	Who were responsible (*)
Daily labour		
Petty trade		
Hand craft		
Fire wood sale		
House rent		
Employment		
Remittance		
Others (specify)_____		

* **1=husband 2=wife 3= son 4=daughter**

5. Do you members of cooperatives? 1 yes 2 no

IV. Onion Production

1. Did you grow onion last year? 1)Yes 2) No
2. If your answer for **Q.1 is yes,** please provide us the following key information

Production system	Onion Variety	Who supply seed	Area (timad)	Production from the area (qt)	Production cost from the area(qt)	Quantity consumed (qt)	Quantity Sold (qt)	Price (Birr/kg)
Rain fed								
Irrigation								

3. Have you ever used agricultural inputs (fertilizer, chemicals, improved seeds etc.) for the production of onion? 1. Yes 2. No
4. If your answer for **Q.3** is Yes, which type and from which source did you get such agricultural inputs in the onion production process? (*Multiple responses is expected)

Types of inputs used	Sources
1. Improved seed 2. Fertilizers 3. Pesticides/herbicides 4. Farm implements 5. Others (specify)	1. OoARD 2. Local market (known sources) 3. Illegal markets 4. Cooperatives 5. NGOs (specify) 6. Research centers (specify) 7. Fellow farmers 8. Others (specify) ____

5. What is the labor source for onion production?
   1. Family labor 3. Labor exchange
   2. Hired labor 4. Cooperation 5. Others (specify)__
6. Total number of oxen you have. 1. No pair oxen 2. One pair oxen 3.two – three pair oxen 4. >four pair oxen
7. What are the onion production constraints on your farm? Rank horizontally (1= most severe, 2= second severe and etc.)

Crop types	Oxen Shortage	Insects	Diseases	Drought	weeds	Flood	Frost	Seed shortage	Fertilizer shortage	Lack of pesticides	others
Onion											

8. What are the onion marketing constraints in your area? _____
9. What are the onion production opportunities on your area? _____.

V. Access to Services

1. How often the extension agent contacted you especially for onion production and marketing purpose in the year 2015/16?
   1. Weekly 3. Monthly 5. Once in a year
   2. Once in two week 4. Twice in the year 6. Any time when I ask them
2. What was the extension advice especially on Onion production?
   1. Seed bed preparation 3. Post-harvest handling 5. Fertilizer applications
   2. Spacing 4. Transplanting 6. Chemical applications 7. Others (specify) ___
3. Type of information/ services do you need in Onion production? Rank vertically *

No.	extension service is required on;	Rank
1.	Seedling/ planting material preparation	
2	Weed control method	
3	Disease management	
4	Field management after plantation	
5	Post-harvest treatments and storage	
6	Marketing	

** 1 = for most need, 2 = for Second need, etc.*

4. Do you have Access to credit? 1=Yes 0= No
5. If your answer for Q. 4 yes, have you received credit in 2016 for Onion production purpose? 1 = Yes 0 = No
6. If your answer for Q. 5 yes, how much did you take for Onion production purpose? _____Birr
7. For what purpose did you take the credit in relation to Onion production?
   1. To purchase fertilizer for Onion 4. To rent in land to extend Onion production
   2. To purchase seed/seedlings of Onion 5. Others (specify)___
   3. To purchase transporting animals
8. From whom did you get credit for Onion production?
   1. Relative 3. Banks 5. Micro finance institution 7. Friends
   2. Traders 4. NGO 6. Peasant association 8. others (specify)_____
9. Did you have access to irrigation for Onion production? 1 = Yes 2 = No
10. . If yes, area planted?_____*timad*
11. If your answer for Q.9 is yes, Source of water 1. Ground water 2. River, 3. Lakes 4. Others_____
12. Method of irrigation 1. Furrow/Over flooding 2. Sprinkler 3. Basin 4. Bordering
13. How much Hours used per day for irrigation water application? _____
14. What is a total number of days used for irrigation water application till harvesting ____
15. Do you use motor pump? 1 yes 0 No
16. If your answer for Q 15 is yes, owner of pump 1. Own pump 2. Rent pump
17. What is the cost of using motor pump? _____

VI Marketing

1. Do you have marketing information in last year? 1. Yes 2. No
2. If your answer for **Q.1** is Yes, from whom did you get the market information?

1. DAs 2. Kebele administration 3. *Woreda* experts 4. Radio 5. Brokers
6. From market 7. Others (specify)_____

3. What type of information did you get? 1. Price information 2. Market place information 3. Buyers' information 4. Other (specify) _____
4. At what time interval do you get the information? 1. Daily 2. Weekly 3. Monthly 4. Other (specify)
5. Was the information you get is valuable? 1. Yes 2. No
6. Did you sell onion last year (2015/16)? 1. Yes 2. No
7. If Q .6 is yes, to whom did you sell? (More than one answer is possible) 1=consumer 2=Retailer 3=Wholesaler 4=Cooperatives/Unions 5=brokers 6=processors 7= commission agents 8= Assemblers
8. To whom do you usually want to sell? _____ (choose from above)
9. Reason for selling to the selected actor? 1. Price difference from others 2. Closeness in distance 3. Transport availability 4. Others (specify)_____
10. For how many weeks/months you store onion for sale (on average)_____weeks /months
11. What was the price of onion immediate after harvest in 2015/16?_____birr/100kg
12. Where do you sale/market place? 1. within village 2. outside village 3. within *woreda* 5. outside *woreda*
13. Who sets your selling price for onion in 2015/16?

1. Yourself 3. Set by demand and supply 5. Others (specify) _
   2. Buyers 4. Negotiations

14. When did you get the money after you sell to local collectors in credit?

1. As soon as I sold 3. Other days after sale

2. After some hours 4. Others (specify) _

15. When did you get the money after you sell to retailers in credit?

1. As soon as I sold 3. On other- days
2. After some hours 4. Others (specify)_

16. When did you get the money after you sell to wholesalers in credit?

1. As soon as I sold 3. On other- days
2. After some hours 4. Others (specify) _

17. Is there a difference in price due to differences in place of sale and the type of buyer?

1. Yes 2. No

18. If your answer for **Q.17** is yes, indicate the price when the product is sold to different actors and in different places.

Place of sale	Price when the product is sold to:					
	consumers	Retailers	Wholesalers	Cooperative /union	Processors	Agent
On the farm/farm gates						
Village market						
Woreda market						
Collection point						

19. Do you have your own transportation facility? 1. yes 0. No
20. If your answer for Q.19 is yes, means of transportation 1. Vehicles 2. Manpower 3, back of animal 4. Car 5. Other specify_____
21. What is the average cost incurred to collect onion products from the farm? ____Birr/day/farm.
22. What are the average costs incurred for transporting and handling 1 qt of onion to the nearby market __Birr?

II. Traders' Interview Schedule

I. Socio-demographics

1. Name of trader _____Sex_____ Age _____Years.
2. Educational level _____
3. Marital status of trader? 1. Single 2. Married 3. Divorced 4. Widows
4. Total family size_____
5. What different languages do you speak?
   1. Afaan Oromo 2. Amharic 3. Tigrigna 4. Others (specify)_____

II. Area information

6. *Woreda* ___ Name of Market_____
   1. Village market 2. Sebeta market 3. Addis Ababa market 4. Others (specify)_____
7. Distance from residence to the market _____Km /walking time in minutes
8. Main occupation
   1. Wholesaler 3. Urban assembler
   2. Retailer 4. village collector/ assemblers 5. Others (specify) _
9. How long have you been in onion trading? _____ years.
10. Do you participate in onion trading year round? 1 = Yes 0 = No
11. From whom do you buy Onion?
    1) Farmers 2) Middle men 3) wholesalers 4) Retailers 5) others specify--------

12. To whom do you sell Onion? 1) Individual consumers 2) cafes 3) others specify____
13. Please indicate your costs, transaction volume and price of onion trading just last one year.

Source & destination Markets (from—to--------	Quantity of onion purchase (kg/day)	#effective months of onion trading/ year	Purchase Price (Birr/ kg)	Sells price (Birr/kg)	Transportation cost (Birr/qt)	Loading/ unloading cost (Birr/qt)	Sacks cost (Birr)	Other costs specify

14. Other costs (storage, tax, etc.)? _____
15. How long do you store onion before selling? _____
16. Estimate the loss (%) _____
17. How do you transport onion? 1) mini bus 2) on human back 3) on donkey back 4) other specify? _____
18. Please indicate the relationship you have with other organizations indicated below

	• Linkage*			If linkage=Yes; Nature of Linkage**			If linkage=Yes; How Much Do You Trust***?			frequency of with other org meeting/year****		
	F	T	P	F	T	P	F	T	P	F	T	P
Farmers(F)												
Traders(T)												
Processors (P)												

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

19. What are the major problems in onion harvest, marketing and transportation in your area?
    - Post-harvest related problems: _____
    - Market related problems: _____
    - Transport related problems: _____

20. Please indicate onion activity calendar in your locality, mark with (√)

Main activities	sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Jun	Jul	Aug
Harvesting												
Marketing												
Low price time												
Medium price												
High price time												

III. Processors

Region: _____; Zone: _____*; Woreda*: _____; Kebele: _____
Name of processor: _____; Sex(M/F) _____ Age: _____ Education level_____ Family size_____

1. How long since you have started onion processing? _____ years
2. From whom do you buy onion?
   1) Farmers 2) Middle men 3) Wholesalers 4) others specify_____
3. To whom do you sell processed onion?
   1) Cafes 2) supper market 3) consumers 4) others specify_____

4. Please indicate your costs, transaction volume and price of processed onion trading just last one year

Type of processing	Quantity of onion purchase (qt/month)	#effective months of onion processing/ year	Purchase Price(Birr/ kg)	Sells price (Birr/kg)	Transportation cost (Birr/qt)	Loading/ unloading cost(Birr/ qt)	Packing	Other costs specify
Baltina								
shiro								
others								

5. Problems related to onion marketing and processing_____

IV. Consumers/Restaurants/Cafes

Region: _____; Zone: _____; *Woreda*: _____; Kebele: _____
Name of Farmer: _____; Sex(M/F) _____ Age: _____
Household size: _____
1. Type of buyer
2. Income (Birr/year): _____
3. Do you consume onion in your household?
4. Quantity purchased per week: 1) Peak season___ kg; Scarce supply season: ____kg
5. From whom do you usually buy onion? 1) Farmers 2) Middle men 3) wholesalers
4) Retailers 5) others specify_____
6. Time when onion is available/scarce:

Onion availability	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Jun	Jul	Aug
Easily available												
Scarce												
Totally not available												

7. Problems related to onion marketing and consumption?

_____
_____

V. Checklist for Farmers Focus Group Discussion

1. What is grown and what is possible to grow in the present conditions? What are the main opportunities and challenges to grow crops? How can productivity be increased? How can production be diversified?
2. How are the soils? What can be done to conserve soil (erosion prevention) and to improve soil quality? What about water, seed and other natural resources?
3. What is the importance of livestock? What are the potentials and challenges in livestock rearing?
4. What are the major production problems?
5. How do traders influence farmers' in onion market?
6. What are the major problems in marketing of onion?
7. Who is responsible for the above problem?
8. What is the quality trend of onion improving or deteriorating?
9. Who is responsible for the problem?
10. How these problems can be solved?
11. Which agricultural inputs that are used have adverse effects? Which are the risks? How can the system be optimized so that less external (and costly) inputs are needed?
12. What can be done in collaboration with others to increase producer share?

13. What happens post-harvest? Ways of minimizing losses and processing techniques?
14. What is sold in the market and what is used in the family? Who makes decisions in agriculture, processing and marketing and based on what are the decisions taken?
15. Which innovations would solve problems, increase productivity, profitability and sustainability of food production? From where could inspiration for innovation come?

VI. Key Informant Discussion with *Woreda* Experts and supporter

1. What are the threats for onion extension service and input supply?
2. What are the most important constraining infrastructures affecting onion marketing?
3. What are the possible solutions to correct these problems?
4. What is the role of FTCs on onion marketing? How?
5. How do you support onion production, trading and marketing?
6. What is your role in onion value chain actors?