Market linkages and strategies for onion smallholder farmers in Lume District, Ethiopia

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By

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DEDICATION

This research work is dedicated to my beloved brother Difabachew Setegn and his wife Abiot Tomas and their loved son Meskay Difabachew.

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LIST OF ABBREVIATIONS

AED	Agriculture Extension Directorate
AGP	Agriculture Growth Program
ATA	Agriculture Transformation Agency
CSA	Central Statistical Agency
DA	Development Agent
DAP	Diammonium phosphate
ETB	Ethiopian Birr
FAO	Food and Agriculture Organisation
FGD	Focus Group Discussion
Gm	Gram
Ha	Hectare
IDA	Irrigation Development Authority
IPM	Integrated Pest Management
Kg	Kilogram
LMD	Labour man day
MoANR	Ministry of Agriculture and Natural Resources
NFP	Netherlands Fellowship Programmes
NGO	Nongovernmental Organisation
OCSA	Oromia Credit and Saving Association
ONRS	Oromia National Regional State
PA	Peasant Association
PESTEC	Political, Economic, Social, Technological, Environmental and Cultural
Qt	Quintal
SMFI	Small and Micro Financial Institution
SMS	Subject Matter Specialist
SWOT	Strengths, Weaknesses, Opportunities and Threats
TMDO	Trade and Market Development Office
UNIDO	United Nations Industrial Development Organisation
WFB	World Fact Book
WFP	World Food Programme

ABSTRACT

This study is aimed at assessing market linkages and strategies for smallholder farmers in Lume District, Ethiopia. The study primarily aimed at identifying appropriate market linkages and strategies that can be introduced by the Agricultural Extension Directorate (AED) to enable farmers to access higher prices of onion in Addis Ababa and benefit from onion production and marketing. Accordingly, the study assessed the current structure of onion value chain and market linkages and strategies to smallholder onion farmers to obtain a higher price in the market. The study specifically analysed, the role and relationship of actors; market channels by quantifying costs and profit margins; actors influencing the chain governance of onion; sustainability of production and marketing; market characteristics and requirements; hindering and supporting factors encountered farmers; chain upgrading system; and viable business model to smallholder farmers. The data was generated by the survey, case study and desk review. The study utilised a pretested semi-structured questionnaire for survey and checklists for a case study. This was supplemented by desk review collected from available sources like internet search, referring appropriate books and review of scientific journal articles. The survey data encoded to SPSS version 20 and analysed using descriptive statistical analysis include percentage, range, mean and standard deviation. The case study data analysed systematically across actors using PESTEC, chain map, stakeholder matrix and SWOT.

The study finding shows that the key value chain actors include input suppliers, farmers, wholesalers, collectors, retailers, supermarkets and consumers. The chain supporters are Agriculture Growth Program, Irrigation Development Authority, Trade and Market Development Office, Small and Micro Finance Institutions and Agricultural Transformation Agency. Five marketing channels were identified in the study area, and among these Channel, III is the dominant channel in terms of volume of onion distribution accounted 64% whereas channel V is the least dominant channel, which is only 3%. The gross margin or value share for the producer is highest in channel IV, which is 75% and lowest in channel I, which is 40% whereas traders share of gross margin is highest in channel I, which is 60% and lowest in channel IV, which is 25%. Regarding profit share, producers get the highest profit per unit when farmers sell to wholesalers, which is 64%. From the chain operators, wholesalers and brokers have the power and influence the chain in assessing the quality and set the price of onion in the market. Government organisation and micro financial institution play a pivotal role in supporting farmers. The pollution of water, soil salinity and intensive application of input (seed, chemical and fertiliser) affect the sustainability of onion production and marketing. The major market characteristics identified include price fluctuation, the absence of standard measurement unit and poor market information use. The identified hindering factors are high involvement of illegal brokers, shortage and high cost of input, high maintenance cost for motor pump and absence of stronger farmers cooperatives while the supporting factors include closer to a big market, the existence of microfinance institutions and water availability. Farmers incurred high production cost to produce onion which is 4.2 Birr per kg. Farmers used a similar type of seed of onion and engaged in market search during product harvest. Short chain, contract farming and producer cooperative are identified as a viable business model for the area of study to integrate onion producing farmers to higher market prices.

To realise market linkages for smallholder farmers to access a higher price, it is suggested to establish farmers cooperative and promote contract farming through the facilitation of Irrigation Development Authority and Agriculture Extension Directorate. In the short term, concerned stakeholders such as Agriculture Extension Directorate and other have to involve to provide market information, reducing intermediaries through selecting a short channel and legalising brokers and traders.

Key words: Onion, value chain, chain actors, profit share, market linkage, strategies

CHAPTER ONE: INTRODUCTION

1.1 Background information

The onion (*Allium cepa* L.), known as the bulb onion or common onion, is a vegetable which extensively cultivated species of the genus Allium. Onions are grown and used around the world as a food item, and they are usually serve cooked, as a vegetable or part of a prepared savoury dish. However, onion can also be eaten raw. They are strong when chopped and contain certain chemical substances which irritate the eyes (VertiGro, 2017). Studies have shown that onion has highly valued for its nutritional value and therapeutic properties. Onion contains a chemical known as organosulfur compounds that have been linked to lowering blood pressure and cholesterol level. Moreover, onion protects against, cardiovascular disease, cancer and cataracts among other (Sampath, Debjit, Chiranjib, Biswajit, & Pankaj, 2010).

The agriculture sector in Ethiopia accounts for 46% of GDP, 80% of export value, 73% of employment and largely dominated by rain-fed subsistence farming by smallholders who cultivate an average land holding of less than a hectare (Aklilu, 2015). After economic reform in Ethiopia in 1991, markets liberalised, restriction on trade lifted, and official pricing has been eliminated (Gebremedhin, 2001). In Ethiopia, vegetable production is vital activity in the agricultural sector. The government focus on the development of irrigation through participating smallholder farmers. In recent times, due to their high nutritional value vegetable have rising demand in local and foreign markets. As a result, commercial farms in Ethiopia grow vegetable over a substantial land area (Central Statistical Agency [CSA], 2015).

The areas of vegetable production and its contribution to the country's total agricultural output are insignificant. The area covered under vegetable stands at 1.43% of the area under all crops at the national level (CSA, 2013). The same report shows that vegetable production constitutes about 2.95% of the total crop production. The area indicates that a considerable proportion of Ethiopians could derive their livelihood from growing and selling vegetables at nearby markets. According to the Ministry of Agriculture and Natural Resources [MoANR] (2015), the potential demand for onion at local, neighbour and Middle East countries have been identified. To access the market, it requires to produce a quality onion and create linkage at the local and overseas market through participating stakeholders in the value chain. According to the Ministry in 2015 onion production and productivity is 259,230 tonne and 10.5 tonnes/ha, respectively.

Table 1 Released improved onion varieties in Ethiopia in gram and quintal[1]

Onion Cultivar	Maturity days	Bulb colour	Bulb shape	Bulb size (gm)	Bulb yield (qt*/ha)	Seed yield, qt/ha
Adama Red	120-135	Dark Red	Flat globe	65-80	350	10-13
Red Creole	130-140	Light red		60-70	300	2-6
Bombay Red	90-110	Light red	Flat globe	70-80	300-400	13-20
Melkam	130-142	Red	High globe	85-100	400	11-15
Dereselegne	100-115	Red	Globe	85-100	380	-

Source: Pongruru & Nagalla (2016)

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[1] Quintal (qt) is the unit used for measuring onion and one quintal is 100 kg.

Onion is produced in many home gardens and also commercially in different parts of the country. Moreover, the expansion of irrigation agriculture has enabled smallholders to produce onion in the dry season. Farmer's production as well as area under onion cover through irrigation is increasing. These conditions enable smallholders to produce a surplus for the market (MoANR, 2015).

Figure 1 Increment of area under smallscale irrigation in thousand hectare
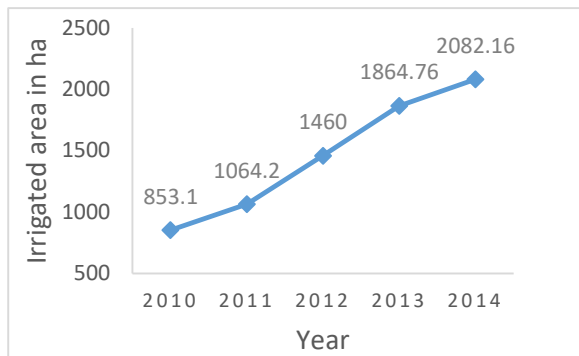
Source: MoANR (2015)

Consumption of horticulture crops in Ethiopia

The fluctuation of food prices encourages extensive food demand analyses and the linkages between agricultural production and labour productivity, and the implications for improved nutrition and health status in developing countries (World Food Program [WFP], 2010). Most of the developing countries consume much fewer fruits and vegetables than the recommended 400 g per person per day (equivalent to 146 kg per person per year) (FAO, 2003). The fruits and vegetable consumption ranged from 26.70 kg to 114 kg per individual per annum in Ethiopia (Lumpkin, Weinberger, & Moore, 2005). It is projected that an average Ethiopian consumes less than 100 gms of vegetable and fruit per day and 36.5kg per year in all horticulture products.

According to Olani & Fikre (2010), onions is an essential horticulture and commercial crop categorised under root crops. Onion is widely produced by smallholder farmers and commercial growers throughout the year for local use, export market and used as a liquid asset for the farmers in Ethiopia. Smallholder farmers produce 95% of vegetable in the country. Onion production is profitable where approximately 85% of the population is living in rural and semi-urban areas. The irrigation potential in Ethiopia is more than two million hectares (Pongruru & Nagalla, 2016).

1.2 Description of Lume District

Lume district is located in-between 8° 12' to 8° 5' N latitude and 39° 01' to 39° 17' E longitude. Approximately 50% of the district has a Midland climate (1,500 to 2,000 meter above sea level). The effective production system is mixed crop-livestock farming (Jergefa, Kelay, Bekana, Teshale, Gustafson, & Kindahl, 2009).

The altitude ranges from 1500 to 2300 meters above sea level, apart from a small portion of the Northern part, which exceeds 2300 meters above sea level. The main river includes the Modjo. From the total land found in the District, 54.3% is arable or cultivable, 3% pasture, 2% forest, and the remaining 40.7% are considered degraded or otherwise unusable. Vegetables particularly onion is an important cash crop in the district (Oromia National Regional State [ONRS], 2012).

Lume is located in the East Shoa Zone of Oromia Regional State, Ethiopia. Lume bordered on the south by the Koka Reservoir, west by Ada'a, north-west by Gimbichu, from the north by the Amhara Region, and from the east by Adama. Modjo is the capital of Lume and includes other small towns in the district include Ejere, Ejersa and Koka. Modjo town is located 73 km far from the capital Addis Ababa. Lume has railway access provided by the Addis Ababa - Djibouti Railway station (ONRS, 2012).

According to CSA (2017), population projection for the year 2017, the population of Lume district account 162,174 of whom 82,489 (51%) are men and 79,685 (49%) are women. From a total population of the district, 62,592 (38.6%) of its population are urban inhabitants, and the remaining majority 99,582 (61.4%) of the population are rural dwellers. Onion is the major vegetable produced in the district. However, problems of small-scale farmers in onion production are characterised by low price during peak harvest season and low access to the market.

Smallholders produce onion using irrigation scheme mainly for marketing purposes. Onion production exhibits seasonality in supply which creates an excess supply of onion to the market within a limited time frame which leads to the decline of prices. Furthermore, due to the absence of sufficient local markets and efficient marketing system, farmers are obliged to sell their outputs at lower prices. According to the Agricultural Transformation Agency [ATA] (2014), small transport network mainly characterises agricultural product markets in Ethiopia. Furthermore, a limited number of traders, inadequate credit facilities, high handling costs, insufficient market information system, and weak bargaining power of farmers.

Figure 2 Map of Ethiopia showing Lume position

Country population- 102,374,044 (World Fact Book [WFB], 2016).
Oromia region population- 35,216,671 (WFB, 2016).
Lume district population– 162,174 (CSA, 2017). Districts' major business activities include agriculture, trade, and investment.

Source: Jergefa et al. (2009)

Onion markets are complex and show long marketing chains. Some farmers sold onion at farm level if there are bulk production and proper infrastructure. Due to the absence of standard and grades, buyers decided the price of commodities through eyeball pricing. The market has a large number of intermediaries and poor information flow among involved actors.

The perishable nature of onion and lack of an organised marketing system resulted in low producers' price during peak harvest season. According to Venema (2012) in cool, dry storage with temperatures between 35 and 55-degree faranite and the relative humidity ranges from 50 to 60 percent; the onions can be stored for 1 to 8 months. The shelf life of onion is hard to pinpoint because it depends upon when it harvested, what type it is, and how it stored before arriving at the warehouse. In a pantry, onion shelf life shortens to two weeks. Thus, farmers sell onion at existing market price and have no bargaining power attributed to the absence of storage practices. According to Dever (2007) in Ethiopia onion is produced in many parts of the country by smallholder farmers, private growers and state enterprise. The current level of vegetable production including onion is low and insufficient to satisfy the growing demand caused by population growth. Smallholder farmers supply onion throughout the year, but they could not generate as much benefit from production (ATA, 2014).

Onion plays a significant role in increasing income of smallholder farmers in Lume district. The district is found in the rift valley of Oromia region of Ethiopia and well known in its production of onion bulb

which produces two times per year. Two onion production seasons found in the district which is from July to December and January to June. The peak harvesting months are December for the first and June for the second round production period. In the study area, in peak production time price of onion falls and during slack period rises. This characteristic creates onion market risky, and uncertain which results in a low price for farmers. Thus, to address the problem of the market a study on market linkages and strategies is necessary to develop the existing chain and find alternative channels that suit onion producing farmers.

1.3 Problem statement

In developing countries like Ethiopia, market failures often result in the low performance of the value chain actors and unfair participation of the poor in the chain process. Growing local and informal markets provide both challenges and opportunities for smallholder farmers in Ethiopia. As a result, in recent years, innovation platforms have been promoted as mechanisms to stimulate and support stakeholders partnership in the context of research for development (Swaans, Puskur, Taye, & Haile, 2013).

According to Lundy, Becx, Zamierowski, Amrein, Hurtado, Mosquera, & Rodríguez (2012) linking smallholders to dynamic markets provide an opportunity for more rapid poverty reduction. High procurement costs associated with collecting, grading and bulking products from dispersed suppliers along with problems of farmers side selling to traders, require creative solutions to supplying the regular quality onion that formal markets require. Due to these challenges, buyers have biased towards the reliability and consistency of large farmers and suppliers.

Despite the production of onion, farmers in Lume District faced the problem of low access to potential market attributed to price distortion by middlemen, seasonality of production, and limitation to access alternative markets which result in low price and income from onion. Subsequently, to address the problem of the market the research focus on adopting new possible strategies and market linkages for farmers, through spotting method of onion marketing that has done in other regions which could serve as a lesson for the study area. Furthermore, onion value chain analysis conducted for the actors engaged in the chain to link smallholder farmers to a higher price market and increase value share.

1.4 Problem owner

The Agriculture Extension Directorate (AED) is one of the core processes of the MoANR working at a national level and based in Addis Ababa. The AED closely monitor the extension service delivery provided across all the regions in the country. Every region has its own Agricultural Bureaus that stretches up to district and Peasant Association level. AED communicate regional offices quarterly or annually for the achievement of the target based on the action plan. AED play a role to create a highly productive agricultural system that uses a more advanced technology that enables the society to get rid of poverty. To this effect, it needs to promote the market-oriented agricultural system and put in place a modern agricultural marketing system is vital.

Therefore, AED has been working to increase the production and productivity of horticulture sector in Ethiopia. Improving production and productivity of onion is one of the primary targets of the AED of MoANR. AED primarily look at upgrading value chain of onion to be able to increase the role and share of smallholder farmers as key players in the production and marketing of onion. The Directorate work with stakeholders to benefit farmers engaged in onion production to enhance income and profit share through linking to higher price markets. However, to access the premium price market failures is still a challenge for farmers. AED is working with Agricultural Growth Program (AGP) project to sustain and benefit the farmers engaged in marketing of vegetable products such as onion. The problem of market

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existed especially during peak harvest season besides the AED facilitation role in the value chain for smallholder farmers. Accordingly, this research help to find possible market linkages and strategies, which contribute to addressing the market challenges.

1.5 Research objective

The research objective is to identify appropriate market linkages and strategies that can be introduced by the Agricultural Extension Directorate (AED) of the MoANR to enable Lume District farmers to access higher prices of onion in Addis Ababa and Adama market and benefit from onion production and marketing.

Addis Ababa is the largest city of Ethiopia and has 3,433,999 inhabitants, and Adama city has 355,475 inhabitants CSA (2017). The capital of Lume is Modjo town which is found in between the city of Adama and Addis Ababa and located 73 km far from Addis Ababa and 25 km from Adama.

1.6 Research questions

Question 1: What is the current structure of onion value chain in Lume district?
Sub-questions
1. What are the role, relationship and value share of chain actors and supporters in the value chain of onion?
2. What are the market channels of onion used as the main outlet for smallholder farmers to reach end market?
3. Which value chain actors and stakeholders are influencing the chain governance of onion?
4. What is the sustainability of smallholder farmers in the production and marketing practices of onion?

Question 2: What market linkages and strategies can be adopted by Agricultural Extension Directorate to smallholder onion farmers in Lume district to obtain a higher price in the market?
Sub-questions
1. What are the present market characteristics and requirements of onion?
2. What are the hindering and supporting factors encountered farmers to access a higher price in the market?
3. What kind of chain upgrading system is required to farmers to access a higher market price?
4. Which is a convenient business model for smallholder farmers to access existing and possible potential markets?

1.7 Limitation and reliability of data

During field data collection, traders especially wholesalers, collectors and retailers were not cooperative for an interview because of fear of legal concerns with related to trade license and other personal reasons. Central wholesalers and retailers in Addis Ababa provided incorrect information due to scare of taxation from local customs authority. The local authority levied a high tax on traders which was unacceptable for traders and as a result not cooperative to give reliable information. Few farmers were reluctant to provide interview unless a benefit or payment in cash is made for them. The researcher tried to fix to reduce unbiasedness through validating the information obtained from traders and some reluctant farmers. The data was validated mainly through triangulation of data obtained from traders against Irrigation Development Authority and communicating experts from Trade and Market Development and focus group discussion as well.

CHAPTER TWO: LITERATURE REVIEW

2.1 Marketing concepts and market channel

Marketing practice provides economic profits while at the same time consider environmental, ethical, and social factors. Marketing is the action and practice of communicating, creating, delivering, and exchanging agriculture product suppliers that value for consumers, clients, partners and society at large (Kotler, Kartajaya, & Setiawan, 2010).

A market channel is a business structure of interdependent organisations which reach from the place of product origin to the consumer with the aim of moving goods to the final destination of consumption (Kotler & Armstrong, 2003).

2.2 Agricultural market in Ethiopia

An agricultural market is a system in which exchange of agricultural produce or service takes place or a system where buyers and sellers interact to buy and sell agricultural goods and services. A market is an actual demand for a product or service which is followed by the purchase of the goods. Accordingly, a market is a group of individuals who have needs and are willing to spend money to satisfy those needs (Gebremedhin, Jemaneh, Hoekstra, & Anandajayasekeram, 2012).

2.2.1 Types of agricultural markets in Ethiopia

There are different types of agricultural markets based on physical location and primary purposes. According to Gebremedhin et al. (2012), there are four types of crop markets.

1. Farm gate markets: These are one-to-one buying and selling of onion which takes place at the farm gate. Buyers are usually hawkers who travel to villages and buy produce at the farm or the household.

2. Assembly markets: These are markets where farmers or local traders sell their produce to collectors, who would later take to wholesale or retail markets. Assembly markets are located in rural areas, but can also be found in small towns close to farming areas.

3. Wholesale markets: These are markets where retailers buy their supplies and found in larger towns and cities. Farmers can also supply onion to wholesalers in these markets. Wholesale markets play significant roles which include firstly, farmers and traders can deliver their produce to one location, and secondly, retailers can buy a broad range of onion from one single place (Gebremedhin et al., 2012).

4. Retail markets are small businesses and consumers, such as restaurants and street-food sellers, procure their supplies. Bigger businesses prefer to buy from wholesale markets or directly from farmers at the farm gate. In Ethiopia, retail markets can be found in rural as well as urban areas, and many villages have retail markets.

Supermarkets: Supermarkets are retail markets, and they have emerged as a convenient, safe, well-managed marketplace for the mid to higher income urban consumer. Farmers can sell to supermarkets, but the buying conditions are more stringent about the frequency of supply, food quality and financial regulation (Gebremedhin et al., 2012).

2.3 Value chain of onion and market function in Ethiopia

The direct actors are involved in commercial activities in the chain which include input suppliers, producers, rural assemblers (local collectors), traders, consumers. The chain supporters are providing financial or non-financial support services. Chain supporters are credit agencies, business service providers, government development agents, NGOs, cooperatives offices, researchers and extension agents. The Stakeholders in the onion value chain are actors, chain supporters and influencers (KIT, Faida, & IIRR, 2006) & (Adugna, 2008).

2.3.1 Stakeholders involved in the value chain

The primary actors: these were input suppliers (seed and other), producers, collectors, wholesaler, retailer and consumer. These actors add value to onion in the process of changing product title. More than one actor performs some functions or role (Pongruru & Nagalla, 2016).

Supporting Stakeholders: According to Martin, Boualay & Julio (2007), access to information or knowledge, technology and finance determine the state of the success of value chain actors. The primary chain supporters include; agricultural office, cooperatives promotion office, microfinance, NGOs and transport service providers.

Influencers: According to Pongruru & Nagalla (2016), chain influencers include government regulatory framework and policies such as trade, revenue authority, market development office and, environmental protection and land administration office.

2.3.2 Marketing functions

According to Adugna (2008), the marketing functions involved in onion marketing system on the exchange between buyers and sellers in Ethiopia include financing, storage, transportation, processing, risk bearing, packaging, marketing information and grading and standardising.

2.4 Sustainability of onion production

According to Pongruru & Nagalla (2016), the quality of seed supplied by the informal sector is not sufficient in Ethiopia. There are problems related to germination capability of the seeds and true to its type. The challenge is aggravated by the short shelf life of onion seed. Most of the time farmers are using 6-8 kg of seeds per hectare which contrasts to the suggested amounts of 3.5-4 kg/ha. Using more input incurs a high cost to farmers besides the increasing price of onion seed on the local markets. This situation is hampering the advancement of onion production for farmers. Onion seed production is affected by a genetic factor and environmental factors which include temperature, rainfall, soil conditions and the presence of beneficial insects.

2.5 Value chain development and approach

Value chains are established by developing the systems into which they are embedded, and it is crucial to recognise the importance of macro and micro level conditions that impact the value chains. It entails chain research, analysis and coming up with strategies then followed by monitoring and evaluation to assess the impact of the intervention. Value chain upgrading refers to the attainment of technological capabilities and market linkages that enable firms to develop their competitiveness and move into higher-value activities (Kaplinsky & Morris, 2000).

Kaplinsky & Morris (2000) further stipulated the value chain approach to analysis and development be widely used by government and nongovernmental organisations aimed at transforming subsistence agriculture into market orientation. One principal objective of the agricultural value chain approach is to enable farmers to produce commodities that are demanded in the market, enable farmers to participate in the market as sellers and earn income for improving their well-being sustainably. Markets can be local, district, sub-national, national, regional or global markets.

The value chain method seeks to enable changes in the orientation and capacity of producers and other value chain actors to increase the competitiveness of the chain and generate wealth for all participating firms, thereby contributing to a development outcome. Changing the orientation and capacity requires an understanding of the incentives of the various stakeholders why they behave in the way they do, and what is needed to motivate them to change their behaviour. According to Kaplinsky & Morris (2000), four aspects of agricultural value chain analysis are of particular importance.

1. Mapping: Mapping in a value chain analysis includes mapping the core processes in the value chain, actors and their interactions, profit and cost structures, the flow of goods and knowledge throughout the chain, the geographical movement of the product, employment characteristics, linkages and interactions with service providers, and constraints and opportunities.

2. Analysing the role of upgrading in the chain: Upgrading includes process upgrading, product upgrading and functional upgrading. Process upgrading indicates the efficiency of production by reducing costs and improving the speed of delivery and product upgrading shows the introduction of new goods or improving old goods. Functional upgrading implies the question of which actors should focus on which activities. For example, should a farmer be a producer, processor, transporter, or should he/she concentrate on fewer activities?

Therefore, value chain upgrading strategy should systematically develop through a consultative process in which all actors participate. To succeed a strategy that includes: secures the ownership and commitment of the chain actors; describes the role of every concerned party including chain actors and supporters. Moreover, enables the achievement of objectives in ways that are acceptable to all actors and with the lowest usage of resources – an adequate balance between objectives and means is indispensable (UNIDO, 2009).

3. Analysing the role of governance in the chain: Governance within a value chain refers to the structure of relationships and coordination mechanism that exist between actors in the value chain.

4. Identification of distribution of benefits of actors in the chain: Through the analysis of margins and profits within a chain, it is possible to determine who benefits from participation in the chain and which actors could most likely benefit from increased support.

2.6 Marketing strategy for smallholder farmers

Gebremedhin et al. (2012) explained market strategies for farmers in Ethiopia. Since market environments change constantly, appropriate marketing strategies must be designed for a particular market environment. Marketing strategies and choices should consider the resources available to market participants, skills and knowledge. Producers and sellers need to develop marketing and business strategies to improve onion sales. The building blocks that sellers consider in developing marketing and business plans are known as the 'marketing mix'. Accordingly, Gebremedhin et al. (2012) described the marketing mix elements consisted of product, price, place and promotion accustomed to smallholder farmers.

1. The product is a commodity or service that is offered for sale which can satisfy a need or a want of customer. The elements considered include variety, type, quality, design, brand, packaging, sizes, labels, services and guarantees. In the case of farmers, it is important that they produce onion for which there is demand. Farmers may need to dry, clean, sort, and grade the onion according to buyer requirements.

2. Price is defined as the monetary value that a seller charges for a unit of a product or service. Items considered under-price include price lists, discounts and credit arrangements. Farmers can influence prices through the choice of product type and quality management practices.

3. The place shows the location of sale and distribution channels. The main elements include market sales points, types of distribution channels, the spatial coverage of distribution channels and transportation facilities. Formalised marketing arrangements with buyers such as contract farming, vertical integration and out-grower schemes may facilitate market access to farmers.

4. Promotion is persuading consumers and users about the nature, quality, utility, benefit and value of the product or service. A realistic description of the product is important to build consumer confidence, continuous promotional strategies especially for new goods and new markets, consideration of costs, benefits and risks in different market options. Information needs of the various types of buyers need to be considered carefully.

2.7 Agribusiness models

FAO (2012), defines the term "business model" as the rationale for how a company creates and structures its relationship to capture value. As food production has become globalised vertical and horizontal linkages are coordinated in a stronger way, and organisational arrangements that appear are more complex (Cook, Klein, & Iliopoulos, 2008). According to Vorley, Lundy, MacGregor (2009), agricultural production organisation becomes essential in overcoming costs, associated with a dispersion of agricultural producers, diseconomies of scales, difficult to access information, finances, technology, inconsistency in quantity and quality and issues in connection with traceability and risk management. A business model is centred on the existence of a smallholder comparative advantage in delivering a product that fulfils the buyers' needs more efficient than other types of sellers (Johnson & Scholes, 2002).

Table 2 Business model for smallholder farmers

Model	Driver	Objective
Producer-driven	• Small-scale farmers themselves	• Newmarket • Higher market price • Stabilise market position
Buyer-driven	• Large farmers • Processors • Exporters • Retailers	• Extra supply volume • Assure supply
Intermediary-driven	• Traders, wholesalers and traditional market actors • NGOs and other support agencies • National and local governments	• Supply more discerning customers • Make market work for the poor • Regional development

Source: Adapted from Bill, Mark, & James (2008)

2.8 Facilitating market linkages and market opportunities in Ethiopia

Market linkage refers to the establishment of arrangements between farmers and buyers for the exchange of produce based on some transaction agreements. The purpose of creating market linkages is to facilitate the flow of products within the different levels of the marketing system. The concept of market linkages assumes the development of long-term business relationships rather than support for short-term sales. The rapid shift in many developing countries from sales in open markets to direct sales through linkages and alliances among supply chain actors is a response to the need for better coordination in the agrifood marketing system. In many cases, linkages may be based on mutual trust without formal written contracts. Formal contracts or out-grower schemes are preferred when the volume of transaction is high, and quality and food safety standards are stringent (Lundy, Becx, Zamierowski, Amrein, Hurtado, Mosquera, & Rodríguez, 2012).

According to Lundy et al. (2012), the linking methodology helps to understand the current functioning of the market chain and key business models and design innovations to empower producer groups to engage more efficiently and buyers to act in ways more amenable to smallholder farmers. Furthermore, the link methodology builds bridges between the often disparate worlds of smallholder farming in developing countries and evolving market opportunities in the global south and developed economies.

Establishment of linkages is done through extension agents, NGOs, farmers themselves approaching buyers, or buyers taking the proactive initiative of approaching farmers. For example, farmers can link up directly with retailers such as supermarkets or fast food chains, or link up with these buyers through intermediaries. In many cases, it may be important to organise farmers into groups (small size informal organisation of farmers for a common marketing objective), or cooperatives (formal farmer organisations) or work with existing such farmer organisations to successfully supply produce to markets. Alternatively, linkages are also created through leading farmers (Lundy et al., 2012).

The relationships between producer organisations and agro-processors, wholesalers and large retailers for a sustainable and regular supply of produce is market linkage. Contract farming and out-grower schemes are typical examples of complex linkages. In many developing countries rapid shift has been taking place from sales through open markets to direct sales that involve linkages and arrangements from production to consumption (Lundy et al., 2012).

2.8.1 Types of market linkage

Ferris, Robbins, Best, Seville, Buxton, Shriver, & Wei (2014) revealed that depending on the desires of individual farmers or farmer groups there are many approaches and interventions. The specific methods and interventions for market linkage approaches include investment in value chains, contract farming, certification schemes and public-private approaches.

Similarly, Gebremedhin et al. (2012) identified several types of market linkage opportunities available to the farmer in Ethiopia. Accordingly, market linkages are formal (written linkage arrangements) or informal (based on trust and understanding). Linkages can be farmer initiated (farmers approaching buyers), buyer initiated (buyers approaching sellers) or facilitated by third parties (extension staff, NGOs). Linkages can also be among individual farmers and buyers, through lead producers, among groups of farmers and buyers, and between formal farmer cooperatives and buyers. Irrespective of how linkages are initiated, the extension staff may have a role to play in supporting farmers link with

and benefit from the market. According to Gebremedhin et al. (2012) the identified market linkage opportunities include;

- Farmer to domestic trader
- Farmer to retailer
- Farmer to agro-processor
- Farmer to exporter
- Farmer to institutional buyer
- Farmer to government marketing parastatal
- Linkages through a leading farmer
- Linkages with groups
- Linkages through cooperatives
- Contract farming and out-grower schemes

Gebremedhin et al. (2012) indicated that these linkage types are not mutually exclusive of each other. For instance, processors can at the same time be exporters. Large retailers can engage farmers in contract farming. The distinguishing feature of market linkages is that some relation or arrangement is created between sellers and buyers.

2.9 Conceptual framework

The core concept of the research study is to identify market link strategies for onion farmers through analysing value chain dimensions. The value chain analysis tries to explain about actor role, relationship, market channel and value share along the chain, chain governance and sustainability. The value chain development dimension looks the current market characteristics, hindering and supporting factors and possible upgrading strategies. Furthermore, viable business model and experience of other districts or regions is presented as possible market link strategies as indicated in Fig 3 below.

Figure 3 Conceptual framework
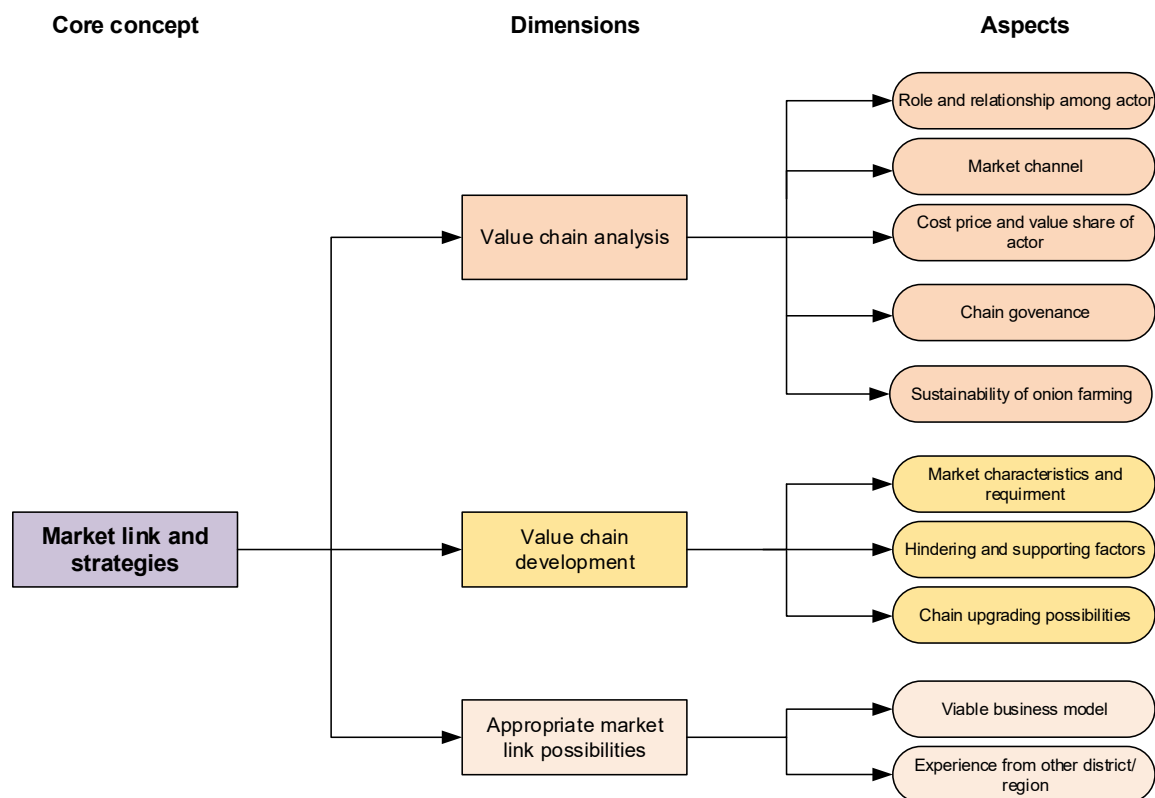
Source: Author sketch

2.10 Operational definition of terms

Value chain- the addition of value as the product progresses from input suppliers to producers and then to consumers. Porter (1985), stipulated as an organisation's competitive advantage is based on their product's value chain.

Market channel- According to Gebremedhin et al. (2012), it is a path through which product passes from farmers to end consumers.

Smallholder farmers- Smallholder farmers, include small-scale farmers who manage land size ranging from less than one hectare to greater than or equal one hectares characterised by using family labour for production and using a small part of the produce for home consumption. In this study, small size and large size farmers are utilised to cluster sampled respondent based on the division of Irrigation Development Authority (IDA) of Lume. According to IDA, farmers cultivating irrigated onion on less than one hectare categorised as small size farmers whereas farmers who produce onion on greater or equal one hectare perceived as a model or large size farmers (Irrigation Development Authority [IDA], 2017).

Kebele- is Amharic word which implies for Peasant Association (PA) and it is the smallest administrative unit in Ethiopia.

Woreda- is Amharic word which means district and is an administrative hierarchy found next to or above Kebele in Ethiopia.

Production season- Onion has two major production season in Lume District. The first one goes from January to June and the second one is from July to December.

Producer cooperative (organisation)-is farmers group engaged in production and marketing of onion at Kebele level in the district.

CHAPTER THREE: METHODOLOGY OF THE RESEARCH

3.1 Study area

The study was conducted in Lume District to investigate the possible market linkages and strategies for farmers to higher market. Accordingly, three Kebeles was selected to carry out a survey based on the semi-structured questionnaire for farmers, and case studies were conducted based on prepared checklists for traders and chain supporters. Focus group discussion (FGD) was also conducted in two purposively selected Peasant Associations (PAs).

As indicated on the map below the three PAs selected for survey include Ejersa Joro, Dungugi Bekele and Koka Negewo.

Figure 4 Sampled Kebeles of onion producing farmers
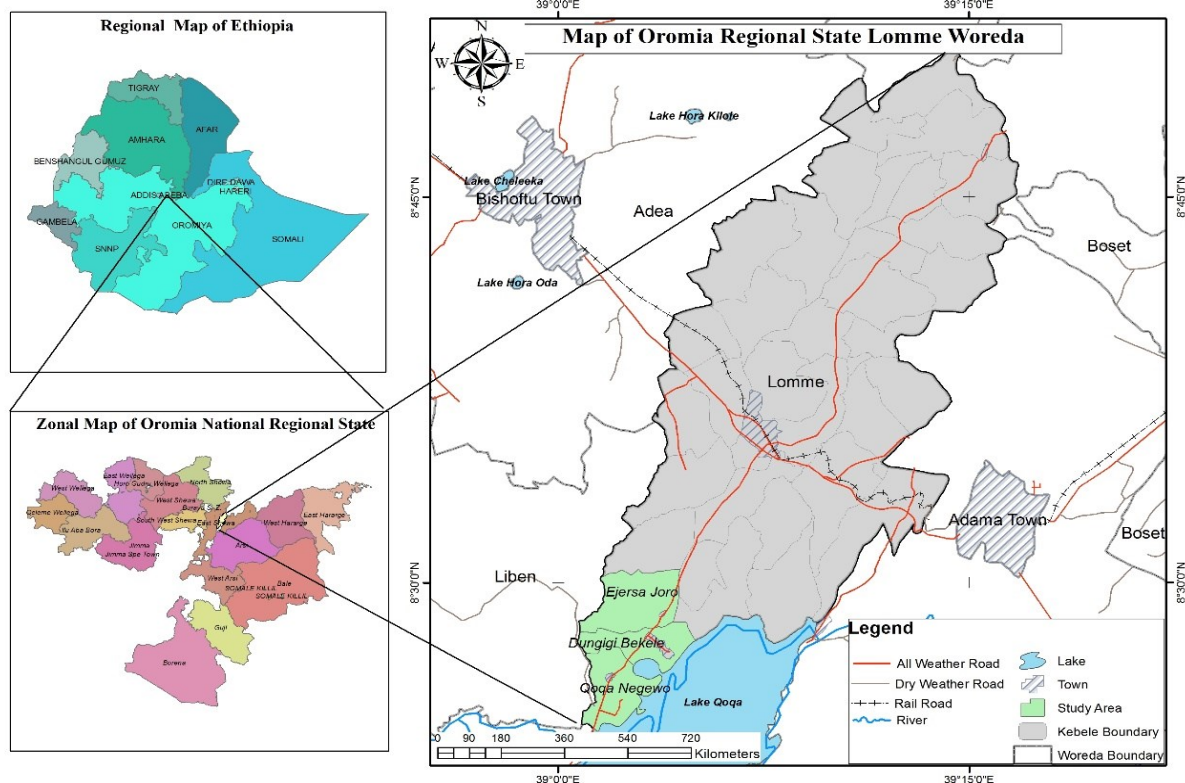
Source: Land Administration and Use Directorate (2017)

3.2 Research design

Data was gathered using appropriate research strategies, which are survey, case study and desk study. Before collection of field data, the researcher communicated Irrigation Development Authority (IDA) officers from Lume District for selecting appropriate Kebeles. Before duplicating the final survey questionnaire, a pilot survey was conducted to amend questionnaire further.

Creswell (2009) noted that a mixed method of research design is suitable when either the quantitative or qualitative approach by itself is insufficient to obtain quality and reliable data. Accordingly, primary data were collected using survey and case studies. The research study gathered quantitative and qualitative information from primary and secondary data sources to analyse market link and strategies to link farmers to a higher price. Primary data sources were farmers, collectors, wholesalers, retailers,

supermarkets and chain supporters include IDA, TMDO and ATA. The present onion value chain analysis, stakeholders role and relationship, market channels and sustainability (research sub-question 1 to 4 under main question 1) analysed through collected survey and case study data. Present market characteristics and requirements, hindering and supporting factors, value chain upgrading strategies and adoption of the viable business model (sub question 1 to 4 under main question 2) analysed using case study, FGD and survey as well.

3.3 Data collection and sampling techniques
3.3.1 Primary data collection
3.3.1.1 Survey

The survey study was conducted to collect quantitative data. Before conducting the field survey in Lume District; first selected the district purposively through communicating experts on the current status of onion market in Ethiopia. The technical experts are consulted from Agriculture Extension Directorate AGP project implementing for upgrading value chain on already selected districts. In the second stage, through discussion with IDA, three onion Kebeles were selected out of 13 irrigated onion producing Kebeles using simple random sampling.

Two clusters of farmers established based on land size cultivated for onion production through discussion with Subject Matter Specialist (SMS) and Development Agents (DA). From selected Kebele 17 onion producing farmers that produce less than 1 hectare of onion and the other 17 farmers who produce greater than or equal 1 hectare was selected for an interview. From the three selected Kebeles, 34 respondents randomly selected using lottery method for an interview. Based on the cluster, farmers that produce onion for the market were interviewed from selected Kebeles. The survey data was collected from January to June production season of onion. The survey questionnaires were designed to explore smallholder onion production practices, production cost, marketing, product and information flow, money flow, distribution, marketing costs and margins. A semi-structured questionnaire was employed for the survey to collect data from farmers.

3.3.1.2 Case study

The case study was conducted on purposively selected traders using a snowball sampling technique, which was by asking a person who has background knowledge about the trader. Similarly, stakeholders were selected purposively through consultation of experts to capture qualitative in-depth interviews and quantitative data as well. The case study was used based on prepared checklists for actors and chain supporters. Traders such as collector, wholesaler, retailer, supermarket and chain supporters include IDA, ATA, Agriculture Growth Program (AGP) and Trade and Market Development Office (TMDO) consulted to collect primary data. For traders; 2 collectors, 4 wholesalers, 4 retailers and 2 supermarkets was interviewed. The interview was based on prepared checklists to address issues like marketing of onion, wastage, loading/unloading, transportation, information and money flow, purchasing and selling price of onion to estimate the value share, cost and profit margin obtained by each actor. For chain supporters consulted, one expert from IDA, TMDO and ATA.

The standardised open-ended interview was utilised to address issues related to hindering and supporting factors in the onion market for farmers and observe the role of traders involved in the value chain of onion based on prepared checklists. The standardised open-ended interview asks the same open-ended questions to all interviewees, and this approach facilitates interviews faster which can be more easily analysed and compared (Valenzuela & Shrivastava, 2017). Camera and sound recorder was employed to capture supportive pictures and audio for chain actors and supporters.

Focus group discussions (FGD): Two FGD was conducted in the district to obtain detailed information about personal and group feelings and opinions and to have an indepth insight of the market linkage and strategies in the district as well. The first FGD was conducted in Ejersa Joro Kebele to have an indepth insight of the study. The second FGD was employed after completion of the survey, and the participants were derived from the previously participated farmer, experts from IDA, women farmers, youth and elders who have knowledge in the production and marketing. The discussions were based on checklists prepared for this purpose. The point of discussion was on the sustainability of onion production and marketing practices and secondly, identifying market characteristics, hindering and supporting factors and discussed the existing channel of marketing. Finally, as the way forward proposed future chain map and provided feedback to farmers.

Direct observation was also conducted in the onion producing areas, and market centres were visited to get information regarding market operations, facilities, transaction systems and retail price of onion.

3.3.2 Secondary data collection
3.3.2.1 Desk study

Secondary data collected through desk study from available sources like internet search, referring appropriate books and review scientific journal articles. Additionally, institutional reports of Ministry of Agriculture and Natural Resources, Irrigation Development Authority (IDA) and survey reports of Central Statistical Agency utilised to obtain relevant information about the situation of the area. Desk study help to identify new possible market link strategies for farmers by looking at onion farming and marketing practices that have been done in other district/region.

The collected information is related to the research objective and demography of Lume to understand more about research study areas with related to onion production and market linkage and strategies.

3.4 Operationalisation

The field research involved 49 respondents in total (see Appendix 14). The data were collected from July 1 to July 31, 2017. The research questions are addressed using data sources from field work and secondary information from IDA. Detail information regarding the operationalisation of the field work can be found in Appendix 1.

3.5 Estimation of quantitative analysis

According to Mendoza (1995), the total gross marketing margin is always related to the price paid by the final consumer and expressed in percentage. To calculate the value share and profit share of value chain actors per kg the following formula was employed.

$$TC = Purchase\ price + Marketing\ cost \qquad (1)$$
$$VA = SP - PP \qquad (2)$$
$$Share\ of\ VA = \frac{AActor's\ value\ added}{Total\ value\ added\ along\ the\ chain} \qquad (3)$$
$$Actors\ profit = SP - TC\ (PP + Marketing\ cost) \qquad (4)$$
$$Profit\ share = \frac{Actor's\ profit}{Total\ profit\ along\ the\ chain} \qquad (5)$$

Where: TC – Total cost
       VA – Value added
       SP – Selling price
       PP – Purchase price

3.6 Data process and analysis

To analyse the survey data, SPSS software version 20 was employed. The survey data coded appropriately before entering to SPSS. After encoding data descriptive statistical analysis include percentage, range, mean and standard deviation utilised to describe farmers and traders using appropriate variables. Onion marketing opportunities, hindering factors, marketing channels, the volume of production and marketing costs and gross margins also described using appropriate tools of analysis include a table, graph, and charts. Moreover, by utilising survey and case study data; a chain map for onion value chain was prepared to show the volume flow, price and profit flow along the market channels of onion.

Interviews were conducted based on checklists for the case study data and analysed systematically across actors participated in the value chain of onion. For the case study, qualitative data was collected and analysed using SWOT, PESTEC, chain map, and stakeholder matrix.
Data gathered from farmers and traders using survey and case study to identify market linkages and strategies to link onion farmers to a higher market. A desk review was conducted to examine alternative market link strategies to farmers. Viable business model and possible market linkages and strategies were discussed and analysed using case study and survey data.

3.7 Research framework

The research framework indicates the research problem, objectives and research questions which are designed based on background information on the study area. For the desk study, literature was reviewed from credential sources which include journal articles, books and publications. For field study, semi-structured questionnaire for household survey, checklists for case study and FGD was prepared and employed to collect data from stakeholders. Then the collected data processed and analysed using SPSS version 20 for survey data while for case study and FGD data were transcribed and analysed systematically. The results and discussion were performed to answer the subquestions of the main research questions. Finally, the conclusion is carried out to respond to the main research questions, and applied recommendation was prepared based on the research objective.

Figure 5 Research framework
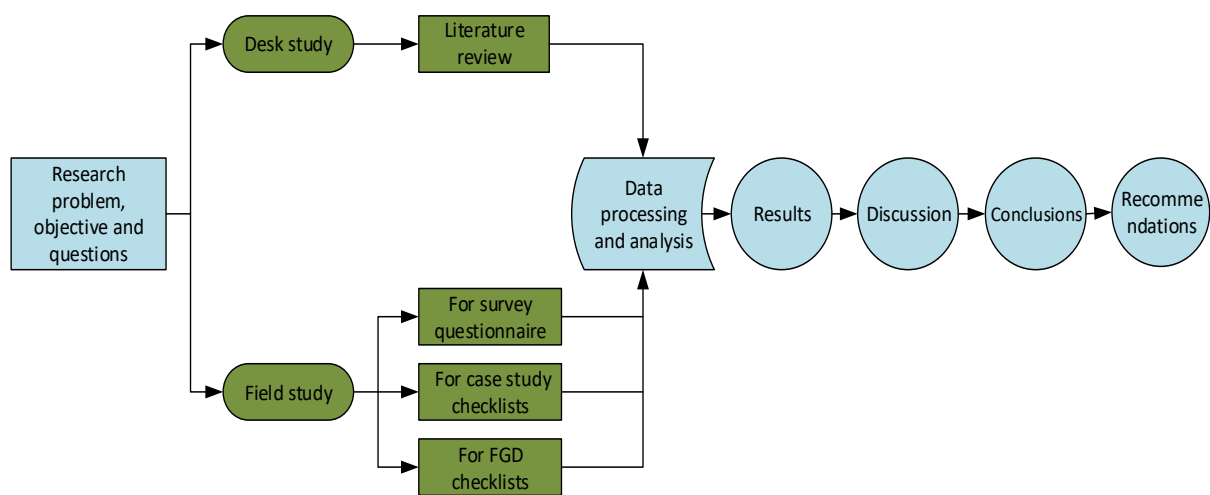
Source: Author sketch

CHAPTER FOUR: VALUE CHAIN ANALYSIS OF ONION IN LUME DISTRICT

4.1 Socio-demographic characteristics of smallholder farmers

1. **Demographic characteristics**: As depicted in the table below the average family size of onion farmers is 7 per household in the district. The mean age of the sampled household is 42 years.

Table 3 Socio-demographic characteristics of the sampled household

	Kebele name							
	Ejersa Joro (N=12)		Dungugi Bekele (N=11)		Koka Negewo (11)		Total (N=34)	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Family size	7	3	6	3	7	3	7	3
Respondent's age	45	14	41	13	41	9	42	12

Source: Author field data

2. **Educational background:** As indicated on the table most of the onion growers educated up to the level of primary education which is accounted 59% of the respondents and the second is 18% which attended informal education. The status of literacy and the number of households attended high school is the lowest which account 12% of the surveyed onion growers.

Table 4 Farmers educational background

	Indicators	Frequency	Percent
Valid	Illiterate	4	11.8
	Informal education	6	17.6
	Primary education	20	58.8
	High school attended	4	11.8
	Total	34	100.0

Source: Author field data

3. **Production and productivity**: As shown in the table below the minimum land holding size is 0.25 hectare, and the maximum one is 10 hectare. The minimum and maximum total quantity of onion produced are 30 and 3600 quintal, respectively. The average or mean productivity of onion is 262 quintal or 26.2 ton per hectare.

Table 5 Production and productivity of onion (hectare and quintal)

	N	Minimum	Maximum	Mean	Std. Deviation
Land used for onion cultivation in hectare	34	.25	10	1.3	1.8
Total output quantity in quintal	34	30	3600	340.8	615.9

Source: Author field data

4.2 Stakeholder analysis in the onion value chain

The main stakeholders participated in the onion chain include value chain actors and chain supporters. The major actors include input suppliers, producers, collectors, wholesalers, retailers, supermarkets and consumers. The chain supporters are IDA, Agriculture Extension Directorate/Agriculture Growth Program (AGP), ATA, Small and Micro Finance Institutions (SMFI), TMDO and brokers.

4.2.1 Value chain actors

The key value chain actors in the onion marketing include input suppliers, producers, collector, wholesalers, retailers, supermarkets and consumers.

4.2.1.1 Input suppliers

The main input suppliers are Lume Adama Union, Markos, Adama General Chemical Trading, and Amio Engineering which provides inputs to farmers. The input suppliers are categorised into three, i.e. based on types of input supplied, which are seeds, equipment and chemicals. Lume Adama Union and Markos supplied fertilisers and onion and tomato vegetable seeds. Farmers mostly preferred Adama red and Bombey red onion seed types. Amio Engineering supplied sprayer equipment, and motor pump for small vendors based in Modjo and Koka town. Adama General Chemical Trading supplied improved pesticides and herbicides chemical. Farmers in the district utilise pesticides chemicals such as mancozium and rudmel. Input suppliers play a role in supplying quality seed and equipment. Farmers selected seed from vendors based on its productivity and quality indicators like colour and size.

4.2.1.2 Producers

Farmers primarily produced onion followed by tomato. Onion farmers are categorised into three types based on the land size and volume of production. The first one is model farmers who cultivate more than one hectare and these farmers at least produce more than 200 quintals in one production season. The second types of farmers are a medium size which owns a land size ranges from half a hectare to one hectare, and their production ranges from 100 to 200 quintals. The third category is small size farmers that cultivate less than half a hectare and produce less than 100 quintals. Small-scale farmers faced financial constraints relative to model farmers.

Producers prefer selling directly from the farmgate market to reduce marketing costs such as transportation and packaging. Farmers supplied onion from the farmgate market to the wholesaler. Brokers usually intermediate farmers and wholesalers for selling onion. Onion producers supplied two times per year, which are January – June and from July – December.

Figure 6 Farmer in Lume district

Source: Author field data

4.2.1.3 Collectors

Collectors own small shades in Koka and Modjo town. The distance between collectors and farmers farmland on average ranges from 5 to 10 km. Collectors assemble onion after the farmer sold the main harvest at the farmgate market to wholesalers. Collectors means of transportation are carts and trucks. Collectors sell onion for local consumers and wholesalers coming from Addis Ababa and Adama.

Figure 7 Collector grading onion in Koka town

Source: Author field data

Collectors are also buying onion from the collectors market. Most collectors are not legally registered due to less confidentiality of the businesses, the existence of unregistered collectors and price fluctuation among other. However, some collectors legally registered and perform onion trading. There is weak coordination among collectors themselves and also farmers and collectors.

4.2.1.4 Wholesalers

Wholesalers are purchasing onion in bulk from farmers and mostly based in Addis Ababa and Adama city. Some wholesalers are also basing in Modjo town as well. Wholesalers usually use brokers to reach farmers in purchasing onion from farmers at the farmgate market.

Wholesalers are renting trucks with its drivers and send to brokers found in Koka and Modjo. Brokers are agents that purchase onion for wholesalers and send back fully loaded truck based on the demand of wholesalers. The discussion with wholesalers indicated that there is variation in quality of onion supplied from farmers. Furthermore, supply fluctuates across seasons of onion. During rainy season quality becomes lower, but during the dry time, the quality of onion is better. Wholesalers switch to other onion producing districts during slack production. The slack supply period occurred during the main cropping season when some part of farmers shift to cereal production. Wholesalers purchased onion and sell to retailers, and large institutional buyers and supermarkets.

Figure 8 Discussion with wholesalers located in Modjo town

Source: Author field data

There is cooperation between farmers and wholesalers based in Modjo through contract farming. Farmers get improved seed, advice and chemicals and wholesalers also provide credit facilities, hire professionals as an adviser, paid wages and provide market price information.

Wholesalers based in Addis Ababa usually use brokers to purchase onion, which hinders farmers to bargain and deal with wholesalers. Farmers and wholesalers do not meet for the transaction to occur because brokers facilitate everything from dealing up to loading the product. According to wholesalers, producers sometimes fails to meet the specified onion quality, which poorly sorts and grade onion that affects the shelf life.

4.2.1.5 Retailers

Retailers purchase onion in small quantities from wholesalers, farmers and collectors and sell to local and urban low-income consumers**.** There are two types of retailers, which include district retailers and central retailers. District retailers are buying directly from farmers and collector while central retailers based in cities and purchase from wholesalers.

The survey finding shows that 9% of harvested onion goes to local market and the remaining 91% supplied for Addis Ababa and regional markets (see figure 9). For retailers, there is sufficient, timely and quality supply of onion. During holiday times due to high demand in the market the volume of onion declines and the price rises. At the retail market, the characteristics of onion market are explained by the price fluctuation and high involvement of brokers. Price fluctuation affects retailers especially when the price drops below the purchase price, which affects retailers to incurs a loss.

4.2.1.6 Supermarkets

The main supermarkets found in Addis Ababa are Shoa, Safeway, Fresh corner and Zefmesh. Low-income consumers consider products sold at the supermarket are expensive. High and middle-income income consumers mostly visit supermarkets to get quality onion at a reasonable price. Supermarkets purchase onion from wholesalers to supply high-income consumers. Supermarkets faced problem in getting an organically produced onion for educated and high-income consumers. Organically produced onion sold at a higher price than the conventional onion in the market. Wholesalers usually supply fresh onion to supermarkets to meet requirements of consumers.

4.2.1.7 Consumers

The consumers are found in the cities of Addis Ababa, Adama and towns of Modjo and Koka. High-income consumers demanded the red, and medium size of onion. A large volume of onion goes to Addis Ababa market. According to IDA, currently, around ten consumer cooperative union found in Addis Ababa. Each union consisted of cooperative consumer range from 8 to 20 in total becomes 109. These consumer cooperative can easily arrange with large-scale farmers or producers cooperative to directly source onion from the farmgate.

4.2.2 Chain supporters
4.2.2.1 Irrigation Development Authority

IDA has a close coordination with Zone and Region Irrigation Development Authority to support farmers mainly through providing capacity building, training and technology dissemination such as planting, caring and harvesting. IDA demonstrate new technologies to farmers at the Farmers Training Center. IDA organised an excursion to farmers for experience sharing and currently working with stakeholders to formulate farmers' cooperative.

The authority also facilitates in supplying motor pump through dealing with local suppliers and importers. Farmers purchased a motor pump from local vendors, and the price ranges from 11,000 to 14,000 Birr[2]. With the facilitation of IDA presently Metal and Engineering Corporation have a loan scheme for supplying motor pump for farmers to pay 30% of the price and pay the remaining 70% later. The Ministry of Agriculture at federal and regional level have to support to tackle the shortage of vehicle and inadequate office equipment facing district IDA.

4.2.2.2 Agriculture Transformation Agency

ATA is set up to boost the capacity of key stakeholders to achieve agricultural transformation through capacitating smallholder farmers. ATA works to solve agricultural problems, which include price fluctuation, price fall during peak production, and unfair involvement of brokers and other actors. Currently, ATA is working through Agriculture and Commercialisation Cluster team to primarily promote and assist market-driven production to smallholder farmers across selected regions and districts in Ethiopia. The interview with ATA indicates that the institute targeted smallholder farmer and presently, introduced digital technology services through agricultural information services hotline (8028) for farmers to get information on input use and other packages. ATA and other stakeholders have to cooperate to include daily market-related information on this digital technology to reach farmers easily.

4.2.2.3 Agricultural Extension Directorate

The Agricultural Growth Program (AGP) is a mega project found under the Agriculture Extension Directorate of the MoANR that have been implemented to increase production and productivity in selected districts. AGP of the Agriculture Extension Directorate assisted farmers in constructing shades up to 56 classes built in Koka, construct rural feeder roads and bridges. AGP supplied office equipment such as tables, desktop, laptops and purchased motorbikes for IDA. AGP assisted local farmers in digging ponds for water collection purpose to raise irrigated water coverage.

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[2] Birr is the currency of Ethiopia can be written as ETB, where one Euro is about 26.5 ETB as per the exchange rate on 30/06/2017.

4.2.2.4 Trade and Market Development Office

The Trade and Market Development Office (TMDO) is in charge of promoting marketing of onion and tackle the problem faced by farmers. According to TMDO, farmers are the primary actors in producing onion, but traders are getting benefit from onion marketing with little value addition role. Currently, TMDO is not identified, monitor and regulate the traders involved in the district. The trade office not recorded and monitored traders in the district. The office does not have a list of brokers, collectors and wholesalers based in the district. Results from discussion indicated that most traders are not legally registered as the office also unable to function properly in legalising of traders in the district. To supplement this, for instance, all of the brokers in the district have no license or not legally registered to work as a broker.

4.2.2.5 Brokers

Brokers are based in Koka and Modjo town for coordinating marketing of onion through communicating wholesalers with farmers in the district. According to IDA most of the brokers are residents of Koka and Modjo towns. Brokers assisted onion farmers and wholesalers based in Addis Ababa and Adama. Brokers deal the price and volume of onion with farmers based on the daily market price of Addis Ababa Atikilt Tera[3] market. Wholesalers transfer money through banks for brokers for purchasing onion from the farmgate market and for instance if a wholesalers order one truck of onion they transfer equivalent money for brokers through the bank. Usually, the broker gets a commission from a wholesaler. However, brokers in the district play a role in price setting, quality assessment and weighing of onion, and mostly they take the side to wholesalers.

4.2.2.6 Small and Microfinance Institutions

Oromia Credit and Saving Association (OCSA), Busa Gonfa and Africa Mender are the main microfinance institutions that provide credit services. OCSA provides up to 15000 Birr as a loan to farmers. OCSA gives priority for giving credits to model farmers as their loan repayment capacity is better than medium and small size farmers.

4.2.3 Existing onion value chain map

The existing value chain map of onion was drawn after identification of the value chain role, value chain actors and chain supporters. The current chain map incorporates the primary value chain actors participated, which include input suppliers, farmers, collectors, wholesalers, retailers, supermarkets and consumers. The major chain supporters and influencers are IDA, TMDO, ATA, Agriculture Extension Directorate, brokers and SMFI.

Selling price and volume distribution used in the chain map as overlays in the value chain map below and the price range used to show the minimum and maximum selling price of onion. The selling price for wholesalers ranges from 8 to 10 Birr per kilogram. Farmers less prefer selling to collectors as the selling price is the least and ranges from 3.5 to 8 Birr per kilogram.

The volume distribution during survey period indicates that most farmers sold onion at the farmgate market directly to wholesalers mainly coming from Addis Ababa and Adama. Small retailers based in Modjo and Koka town sell to local consumers, hawkers and passing passengers.

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[3] Atikilt Tera is an Amharic phrase equivalent to the English *vegetable market place.*

Figure 9 Current onion value chain map in Lume District

Functions	Chain actors	Supporters

Consuming

Low income consumers | High/low income consumers | Low income consumers

13 -15 | 13-15 | 13-15

Retailing

Retailers — 808 t | Cooperatives & supermarket — 246 t | Local Retailers — 105 t

7 - 13 | 7 - 13 | 7 - 13

Wholesaling

Wholesalers — 1054 t

8 - 10 | 8 - 10

Collecting

Collectors — 139 t

5 - 11 | 3.5 - 8

Producing

34 Small holder farmers — 1159 t

Input supplying

Adama General Chemical Trading Amio Engineering, Lume Adama Union and Markos

Supporters: District Market Development Office; District Irrigation Development Authority; Brokers; Agricultural Extension Directorate; Agriculture Transformation Agency; Small and Micro financial Institutions

Information flow / Money flow

Legend
- Selling price range in ETB/ kg
- Volume distribution in ton
- Information (price & volume) flow
- Money flow to all actors
- 1€ = 26.5 ETB as of June, 2017

Source: Author field data

4.3 Market channels and value share of actors in the chain

4.3.1 Existing market channels

Five marketing channels, which are used as the main outlet for farmers were identified. Channel III is designated as the dominant channel in which from the total volume transacted 64% of onion passed through this channel followed by channel IV, which is accounted 21% of the volume passed through this channel. Channel V is the least dominant channel accounted 3% of the total volume of onion sold to the market.

Figure 10 The major onion marketing channel
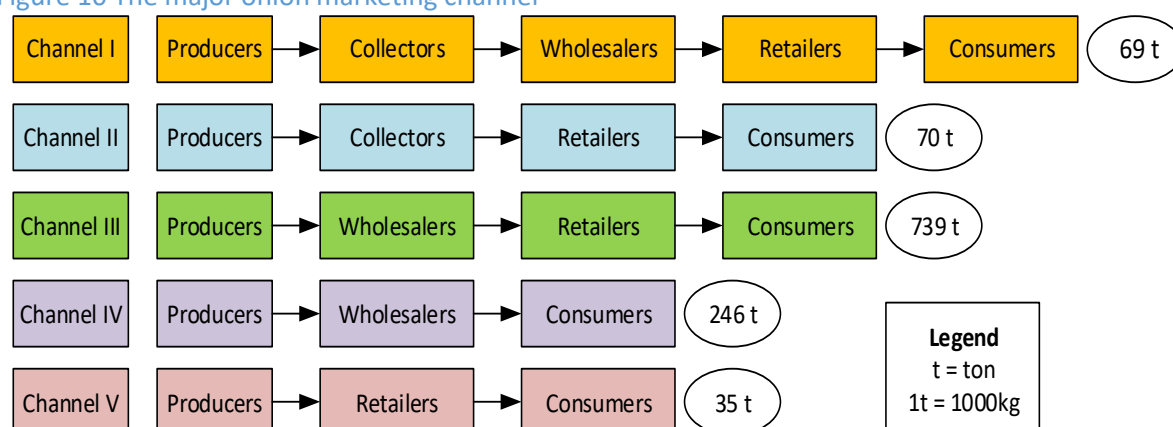
Source: Author field data

Channel I is the longest whereby all the chain operators in the district participated. The volume distribution in the channel I and channel II is 69 ton and 70 ton, respectively. The volume distribution is relatively similar in the channel I and II in which shows that the collectors have got an equal chance or possibility to sell either to wholesaler or retailers. As stipulated in the graph above channel V is the least in terms of volume distribution and in this channel retailers supply the local consumers in the district, which include mainly consumers of Modjo and Koka town. In the channel, IV wholesalers purchase and distribute for institutional consumers (consumer cooperatives and supermarkets).

4.3.2 Cost, price and value share of actors

The key operators in the value chain of onion are four, which includes a farmer, collector, wholesaler and retailer. The mean gross margin and profit per unit are estimated for each actor in the value chain taking the five marketing channel choice of farmer into consideration.

4.3.2.1 Cost, price and value share in channel I

As indicated in the table below in channel I farmers gross margin is 40% while the traders share is 60%. However, farmer obtained the least profit share, which accounts 18% and the collectors and retailers get the highest profit, which is 35% and 28%, respectively. Collectors got highest value addition from traders, which is 4 Birr.

Table 6 Mean value and profit share of actors in channel I per kg

Indicators	Chain Actors				Total
	Producer	Collector	Wholesaler	Retailer	
Cost price	4.2	6	9.1	11.2	
Purchase price	0	5	9	11	
Selling price	6	9	11	14	
Value added	6	4	2	3	15
Gross margin[4]	40	27	13	20	100
Profit	1.8	4	2	2.8	10
Profit share (%)	**18**	**35**	**19**	**28**	**100**

Source: Author field data

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[4] The gross margin shows the percentage share of the total value-added

25

4.3.2.2 Cost, price and value share in channel II

In channel II the profit share per unit is highest for collectors (44%) and lowest for farmers, which is 26% of the total share.

Table 7 Mean value and profit share of actors in channel II per kg

Indicator	Chain actor			Total
	Producer	**Collector**	**Retailer**	
Cost price	4.2	7	11	
Purchase price	0	6	10	
Selling price	6	10	13	
Value added	6	4	3	13
Gross margin (%)	46	31	23	100
Profit	1.8	3	2	7
Profit share (%)	**26**	**44**	**29**	**100**

Source: Author field data

4.3.2.3 Cost, price and value share in channel III

Channel III is the most important as the majority of onion (64%) pass through this channel (Figure 10). In this channel, farmers sell at the farmgate. In Channel III farmers get 34% profit share where the traders take the rest 66% of profit per unit. Farmers get high-profit margin in channel III as compared to the channel I and channel II.

Table 8 Mean value and profit share of actors in channel III per kg

Indicators	Chain Actors			Total
	Producer	**Wholesaler**	**Retailer**	
Cost price	4.2	7	9	
Purchase price	0	6	8	
Selling price	6	8	11	
Value added	6	2	3	11
Gross margin (%)	55	18	27	100
Profit	1.8	1	2.5	5
Profit share (%)	**34**	**19**	**47**	**100**

Source: Author field data

4.3.2.4 Cost, price and value share in channel IV

Channel IV is the short channel for farmers and profit share per unit is also highest as compared to other four channels, which accounted 64% and the gross margin of farmers is high, which is 75%. In this channel, wholesalers sell to cooperative consumers and high-income consumers through supermarkets.

Table 9 Mean value and profit share of actors in channel IV per kg

Indicators	Chain Actors		Total
	Producer	**Wholesaler**	
Cost price	4.2	7	
Purchase price	0	6	
Selling price	6	8	
Value added	6	2	8
Gross margin (%)	75	25	100
Profit	1.8	1	3
Profit share (%)	**64**	**36**	**100**

Source: Author field data

4.3.2.5 Cost, price and value share in channel V

Channel V is the second higher channel in terms of farmers profit share, which is 42%. Although the farmer generates higher profit in this channel retailers are unable to buy in bulk due to financial constraint. The gross margin of farmers in this channel is 67% and the rest 33% is for traders.

Table 10 Mean value and profit share of actors in channel V per kg

Indicators	Chain Actors		Total
	Producer	Retailer	
Cost price	4.2	6.5	
Purchase price	0	6	
Selling price	6	9	
Value added	6	3	9
Gross margin (%)	67	33	100
Profit	1.8	2.5	4
Profit share (%)	**42**	**58**	**100**

Source: Author field data

4.4 Chain governance

The governance forms of onion value chain is a market or spot type of governance structure where a given farmer has many possibilities in selling onion in the market. Usually, farmer incurs a cost for finding a buyer in the market and prefer selling at the farmgate.

4.4.1 Vertical integration

Wholesalers and brokers have a closer relationship in dealing with purchasing of onion from farmers in the district and determine the purchase price of onion considering the existing market in Addis Ababa Atikilt Tera market. Farmers have the least role in bargaining and setting selling prices with traders in the district, and they are price takers in the market. According to IDA, in most cases, wholesalers and farmers do not know each other and wholesalers are not providing input and loan services for farmers. However, few wholesaler based in Modjo have contract relation with a farmer in terms of availing credit facility, advice and input supply. Overall there is a weak vertical integration in between wholesalers and farmers. Input suppliers are key players in supplying of seed, chemicals such as pesticides and equipment like motor pump. During FGD, farmers revealed that input is not available as per demands of the farmer. The quality of motor pump supplied by input supplier is poor, where farmers are exposed for maintenance related cost.

4.4.2 Horizontal integration

Stakeholders participation and management is necessary to develop the whole onion value chain. Government agriculture extension unit provides extension service to onion farmers, which account 73% (see Table 11). The types of extension service are capacity development through training of farmers, field demonstration and prepare excursion to adapt and scale up best practices. However, results from FGD shows that farmers are not getting inputs timely. For instance, when fertiliser and chemical shortage occurs in the market farmers are enforced to travel distant place to get inputs. Therefore, there is a problem of closely supporting farmers to address input shortage and IDA, and other concerned partners also have weak integration in assisting farmers.

Table 11 Extension service delivery and advice for farmers

Indicator	Producer response	Frequency	Percent
Who is providing extension services for farmers in the production of onion?	Government agriculture extension unit	25	73
	From own experience	5	15
	Other farmers	4	12
	Total	34	100

Source: Author field data

4.5 Sustainability of farmers in the onion production

4.5.1 People

Basic needs: In Lume district access to water, health centre and education are inadequate for especially remote PAs. Infrastructure facilities for remote rural PAs are in a weak status, which can be an obstacle to sell their produce to the nearest market outlet.

Labour: Farmers are mainly using daily labourer for planting, watering and harvesting of onion. On average the wage paid to male and female are equal if they performed on the same job. But some works such as chemical spraying carried out by male labourers. The chemical sprayer is not following safety precautions and procedures while spraying chemicals. Moreover, child labour is also found in the district.

4.5.2 Planet

Water pollution: Modjo tannery factory pollutes River Modjo where all the farmers around the river basin are affected by the contamination. The toxic substances released from the factory pollutes the air, water and land in the district, which negatively affects the environment and health of the people and also a cause for the production of onion to drop.

Production and productivity trend: The trend data gathered from IDA revealed that onion production and productivity is increasing from the year 2013 to 2016 as shown in the figure below. The same data indicated that both yield and productivity falls in the year 2017. According to IDA, this is due to soil salinity, and some other growers divert to tomato and other vegetable production.

Figure 11 Trend of production and productivity of onion in Lume District in ton and per ha
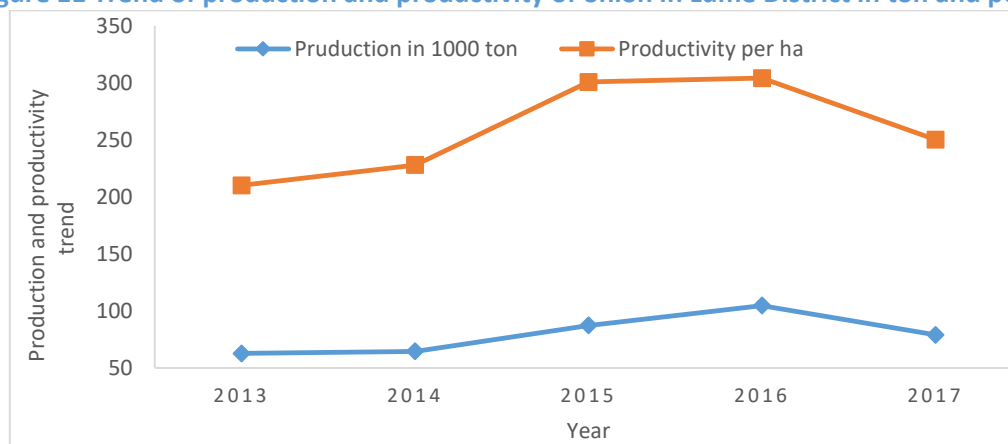
Source: IDA (2017)

Soil salinity: According to IDA the application of fertiliser rate per hectare is high. Most farmers use four quintals of Diammonium phosphate/DAP and Urea for a hectare, but the national recommendation rate is two quintal of DAP and Urea per a hectare. However, this practice affected the soil condition that resulted in salinity. IDA stated that soil salinity gradually declines productivity and affects the sustainability of onion production.

Use of chemical: IDA advise farmers to control disease using Integrated Pest Management/IPM and to spray chemicals up to eight times till harvest stage, but farmers spray chemicals beyond the recommended rate up to 12 times.

4.5.3 Profit

Seed utilisation: IDA revealed that farmers used 8-10 kg of onion seed per a hectare, which is higher than the Authority's recommendation, which is 6 kg per hectare and this raises the cost of onion growers in the district.

Market power: Farmers have no power in the market as brokers are the main in the determination of price, which leaves farmers vulnerable chain operators for the reason of price volatility.

Trading agreement: Farmer does not make a contractual agreement for selling onion during harvest with a wholesaler, which exposed them for exploitation by brokers in the district.

4.6 Gender role

Gender composition: The survey indicates that onion is primarily grown by a male-headed farmer, which account 94% of the respondents. But only 6% of female farmer produced onion.

Figure 12 Respondents gender composition and land size ownership
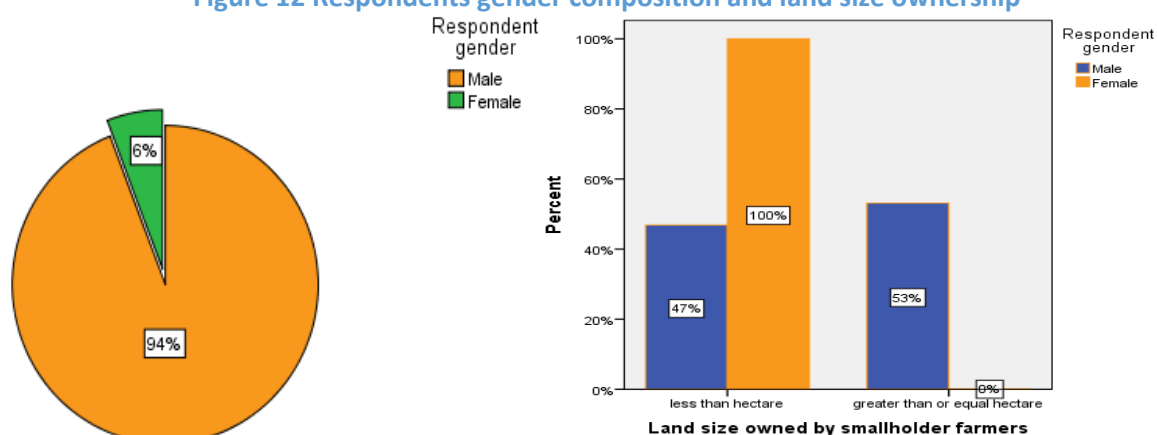
Source: Author field data

Results from case study reveal that women are participating primarily in the planting, watering, harvesting and sorting of onion. Women mainly engaged in retailing of onion to the local consumers. Women are participating in roadside selling for hawkers and passenger. Men are highly dominating the marketing of onion while women role confines in the production.

The land ownership right: is important to achieve gender equality through empowering women through securing land right in Ethiopia. Results from IDA shows that male-headed farmers dominated the rural landholding, which reduces the number of women onion producing farmer. All interviewed women farmers are a widow or have no husband. The survey data shows that all female (100%) produced onion on less than one hectare, but only 47% of male farmers produced less than a hectare.

CHAPTER FIVE: ANALYSIS OF ONION VALUE CHAIN DEVELOPMENT IN LUME DISTRICT

5.1 Onion market characteristics

5.1.1 Price fluctuation

Due to the seasonality nature of production in the district, smallholder farmers are always uncertain, which is attributed to the rise and fall of price in the market. This price fluctuation makes onion production a very risky business in the district. Majority of farmers sell their onion below mean price in peak production season because of the absence of storage facilities. Supply of onion decreases during the period from July to September. During a shortage of onion in the market selling price rises. On the other hand, during peak production, i.e. from January to June, price falls on average due to excess supply and absence of linking onion to export market destination. Price falls during the end of May and beginning of June and in December and January as well. As indicated in Figure 13 below onion price is highly volatile across the month January to June 2017 production season.

Figure 13 Price volatility and the rate of satisfaction of farmers
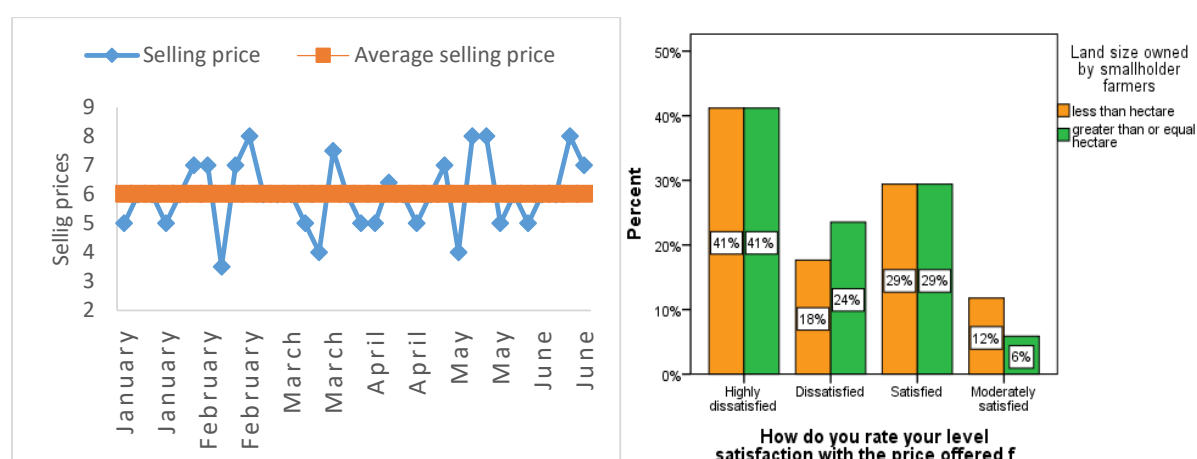
Source: Author field data

Small size and large size farmers highly dissatisfied (41%) with the price offered in the market. However small size farmers moderately satisfied 12% as compared to large size farmers, which is 6%.

5.1.2 Vertical and horizontal linkages

Smallholder farmers are price takers and usually communicate brokers to sell their onion. Brokers deal with farmers on behalf of wholesalers. Usually, wholesalers and farmers do not meet for selling at the farmgate market in the district. The survey findings indicated that there is a weak vertical linkage and coordination between farmers and key chain operators such as wholesalers in the value chain. On the other hand, there is coordination among traders. Nevertheless, wholesalers and retailers support each other in which retailers can take onion products without payment, and they pay wholesalers after selling onion to consumers.

During FGD, farmers revealed stakeholders such as TMDO and IDA are not organised to impact and support farmers in the value chain. Farmers obtain input from local vendors and market price information from brokers. Even though AGP constructs market infrastructures such as roads and

bridges for smallholder farmers, there is still a problem of road, especially during rainy season. Accordingly, the chain supporters provide service to farmers in disorganised ways where the poor horizontal linkage hindered the chain development of onion in the district.

5.1.3 Absence of standard measurement unit

Traders are using a wooden made crate in weighing onion. Previously the net weight of the crate was 10 kg, and currently, brokers introduced a new crate, which weighs 5-6 kg. However, brokers deducted 10 weigh of onion per crate as before, which means the brokers get 4-5 kg of onion per crate. If for instance, the total weight of a single onion crate is 50 kg and farmers loading a truck with holding a capacity of 120 crates, then, brokers get 480-600 kg of onion. During FGD, farmers noted that they know the broker mischief, but they have no power to alter and sell to other traders as they want. Results from FGD shows that the absence of a standard for measuring onion disturbs the market and more importantly due to lack of inspection from concerned authorities.

5.1.4 Market information use

Farmers usually assess prices before selling onion in the market. Results from the survey indicated that brokers are the main information source, which accounts 85% for farmers followed by 9%, which is information obtained from other farmers. Usually, farmers get market information from brokers who often have the power to set the price to farmers, and as indicated below in the table 68% of farmers responded brokers set the price.

Table 12 Source of information and price setting in the value chain

Indicators	Response of actor	Frequency	Percent
	Broker	29	85
	Other farmers	3	9
Who is the source of information?	Grade specifiers	1	3
	Traders	1	3
	Total	34	100
	Farmer	2	5.9
	Broker	23	67.6
Who determines the price of onion in the market?	Wholesaler	7	20.6
	Don't know	2	5.9
	Total	34	100

Source: Author field data

Brokers accounted 68% in price setting for onion followed by wholesalers approximately 21% while farmers have the least role in determining the price.

5.2 Major onion production practice and market requirements

There are two main onion production seasons in the district. The first production season is from January to June and the second one from July to December. Farmers require two months to grows onion seedling. The planted seedling requires three months for delivery to market. During summer season usually onion price increased as farmers shift to cultivate other crops such as maize, wheat and teff among other.

5.2.1 Grading the quality of onion

Onion produced in the district is standardised into three grade levels. However, this standard is not recognised at the national level as there is no official grading being done so far. The grading has been done locally based on extrinsic quality criteria such as size, colour, taste and variety of onion. The first grade of onion exhibits medium, red and have an attractive appearance. The second grade is large and red colour. The third one is small, bruised, which has low demand in the market. The local people commonly called the third-grade "*aferfaro''* which is sold to local market.

Therefore, a given farmer has to meet the extrinsic quality criteria of onion to traders and consumers to meet the market requirement. Furthermore, onion free of disease and bruise also considered as an additional market requirement. Farmers mostly prefer Adama red and Bombey red during seed selection process because of the yield and demands in the market.

Figure 14 Actors assessing the quality of onion at the farmgate

Brokers and wholesalers are the key players assessing the quality of onion. The survey result shows that brokers are the one assessing the quality of onion before sell and there is a slight difference between small size farmers (71%) and large size farmers (88%) in quality assessment of onion. Wholesalers and farmers have the least share in the quality assessment process.
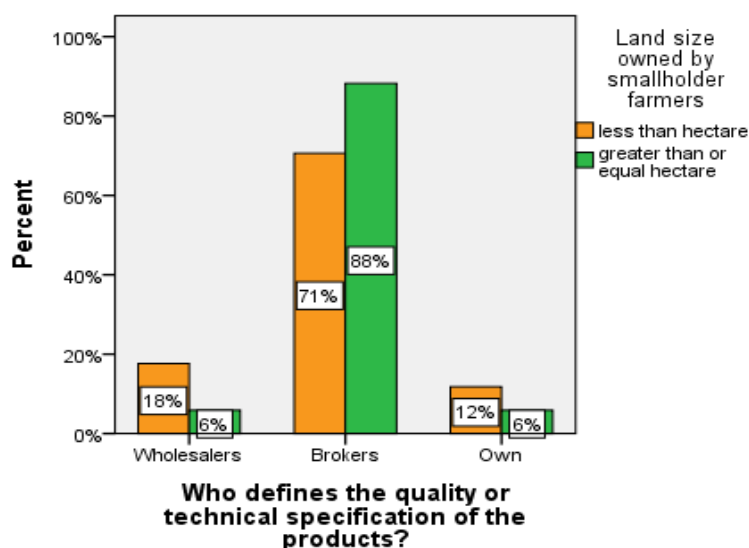
Source: Author field data

5.3 Factor affecting marketing of onion producing farmers
5.3.1 Hindering factors

Farmers in Lume District produce two times, and some farmers produce three times per year. However, smallholder farmers faced obstacles starting from input purchase, production and marketing of onion. The major hindering factors include price fluctuation of onion, high involvement of illegal brokers, and river water pollution by the waste of tannery factory. Other constraining factors include the absence of storage facilities, shortage and the high cost of input, high maintenance cost for motor pump, lack of stronger farmers' cooperatives and producing similar products at the same time or there is no diversification practice.

Farmers in Lume District practice excess application of fertiliser per hectare for producing onion. According to the information from IDA, currently, farmers use two quintals of DAP and two quintals of Urea for a hectare though the recommendation rate is one quintal of DAP and Urea for a hectare.

The other hindering factors include a shortage of land for cultivation, climate change, lack of exporting surplus onion to neighbouring countries and weak coordination among stakeholders.

5.3.2 Supporting factors

The main supporting factors for producing and marketing of onion in the district include availability of infrastructure, availability of water for irrigation, closer to large market, the presence of microfinance institutions and existence of research institute.

During FGD, farmers exposed to have and establish a farmer's cooperatives in the production and marketing of onion. The presence of private investors helps farmers to benefit in getting credit access and advisory support to farmers through contract farming. The other supporting factor includes the presence of cheap labour, favourable climate and agroecology condition and advisory and support from AED/AGP. AGP technically provides training and capacity building, whereas materially, it constructs shades, purchase motorcycles and office equipment for stakeholders in the district.

5.3.3 External factor analysis (PESTEC)

PESTEC analyses were implemented to show external factors affecting the value chain of onion and draw points of intervention in the chain. Accordingly, the political, economic, social, technological, environmental and cultural factors described in the PESTEC matrix below.

Table 13 PESTEC matrix

PESTEC	
Indicator tool	**Description**
Political	• Government imposed high tax on traders
	• Land tenure system and insecurity of land right ownership
	• Poor local governance structure
	• Unsupportive policy of the government
Economical	• Potential to increase productivity and land size
	• Low accessibility of credit services
	• Availability of infrastructure facilities
	• Existence of other high-value crops
	• Uncertainty of price in the market
Social	• Skill transfer from neighbouring district
	• Existence of child labour
	• Conflict of interest between the Authority and contract farmers
Technological	• ATA introduced agricultural information services hotline (8028) digital technology
	• Dissemination of improved variety
	• Supply of new motor pump machine
	• Absence of warehouse/shelters to elongate shelf life of onion
Environmental	• Water pollution from tannery factory
	• Incidence of disease
	• Climate change
	• Flooding
Cultural	• Limited participation and role of women in the sector

Source: Author field data

5.4 Onion value chain upgrading
5.4.1 Process upgrading

The cost for input such as seed, fertiliser, chemical and land rent increased per unit production cost of onion farmers. Based on a survey finding farmers spend 4.2 Birr cost price on average to produce one kg of onion. Farmers are always suspicious about the price, and the marketing condition due to price volatility, high involvement of illegal brokers and no diversification exacerbate the problem.

According to ATA to raise the efficiency of production and reduce the production cost of farmers have to use inputs as per the national recommendation rate. ATA, AED and IDA need to cooperate to provide training and capacity building for farmers to be able to use fertiliser and other input as per the recommendation rate. IDA is currently working to link onion farmers to higher price market through selling directly to institutions such as universities and consumer cooperatives.

Pearson correlation test has been conducted to proof whether there is a correlation between fertiliser application and yield of onion obtained and the result indicated that there is a significant and strong correlation between fertiliser used and yield of onion. However, according to IDA, the intensive use of fertiliser resulted in soil salinity and production to decline in the long run.

Table 14 The correlations between total yield per ha and amount of fertiliser used in quintal

Correlations			
		Total yield	Amount of fertiliser used
Total yield	Pearson Correlation	1	.921[**]
	Sig. (2-tailed)		0
	N	34	33
Amount of fertiliser used	Pearson Correlation	.921[**]	1
	Sig. (2-tailed)	0	
	N	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Author field data

5.4.2 Product upgrading

Due to the short shelf life of onion and absence of storage facilities, it becomes a challenge for farmers to bargain reasonable price for selling onion. According to IDA, product upgrading can be performed through diversifying products sold in the market and introducing a new onion variety for growers. There is a possibility for farmers to grow tomato, cabbage and other cash crops side by side. Farmers repeatedly use the same types of onion seed, which are Adama red and Bombey red. Accordingly, utilising other onion varieties that have a high yield and longer shelf life enables farmers to tackle the problem faced. The discussion with ATA shows that there is a practice of linking fruits like avocado with neighbouring countries and Middle East market. Such type of activity has to be strengthened to incorporate vegetable product such as onion as well.

The Pearson correlation test indicated that seed quantity significantly affects the output of onion sold in the market, which indicates there is a strong correlation 0.82 at 1% level of significance. Therefore, farmers have to select the seed type properly to benefit from the yield.

Table 15 The correlations between seed quantity used and output in kg

	Correlations		
		Seed quantity	Output
Seed quantity	Pearson Correlation	1	.820**
	Sig. (2-tailed)		.000
	N	34	34
Output in kg	Pearson Correlation	.820**	1
	Sig. (2-tailed)	.000	
	N	34	34

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Author field data

5.4.3 Functional upgrading

Farmers conduct various activities from onion seed purchase, seedbed preparation and seedling production, planting, caring up to the harvest of onion. Farmers perform a market search when onion harvested for market. The interview with IDA shows that farmers are producing quality onion to the level of the market requirement. Establishing farmers cooperatives is fundamental to farmers and IDA as well to raise the value share of farmers and help them to bargain and sell onion at a premium price in the market. In terms function the local government have to encourage investors to share their experience with farmers in the production and marketing of onion.

Figure 15 Farmers value addition activities at the farmgate

Farmers primarily sell onion at farmgate market performing grading, packaging and sorting activities before selling onion. Grading is equally done by both large and small size farmers, which is about 35% and less perform on sorting (12%) functions. About 41% of the large size and 35% of small size farmers responded that they do nothing on the value addition of onion other than selling at farmgate.
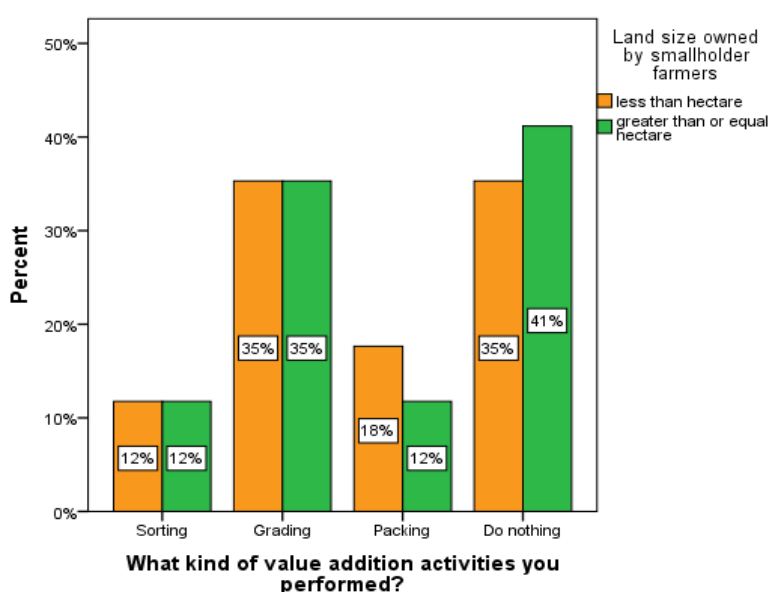
Source: Author field data

5.5 Existing business model applicable for farmers
5.5.1 Short chain

Results from FGD shows that farmers are getting more benefit if they directly sell for wholesale without intermediary involvement. Farmers direct selling to consumer cooperatives found in Addis Ababa and Adama also raised as an alternative of channelling onion.

Figure 16 Farmer places of selling onion

The survey results indicated that 88% of the large size and 82% of small size farmers sell onion at the farmgate market whereas 6% of both large and small size farmer preferred selling to the retail market.

Comparatively, 12% of small size farmers used wholesale market than large size farmers, which is 6% only. Onion growers preferred selling at farmgate to reduce transportation and packaging cost and less preferred selling at the wholesale market.
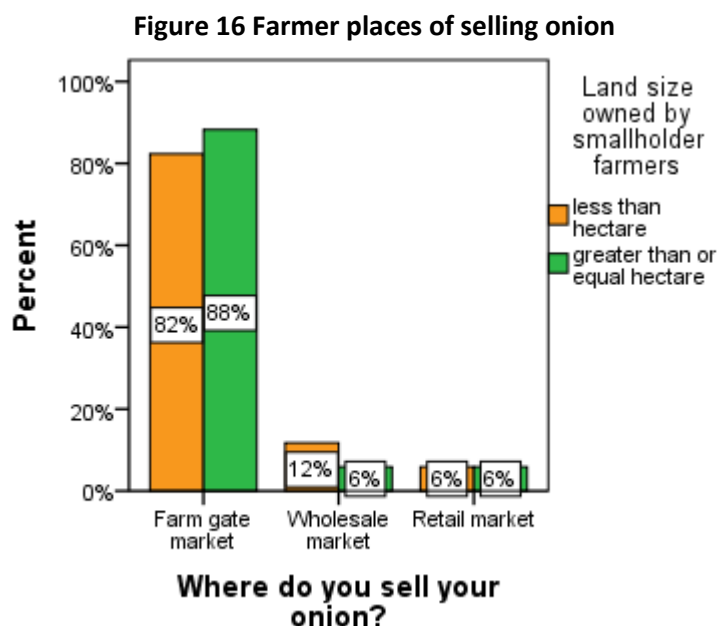
Source: Author field data

Figure 17 Farmers channel choice for selling onion in the market

The survey result for farmer channel choice shows that 71% of small size farmer and 65% of large size farmer prefer selling through farmers cooperatives and large size farmer shows no preference in selling directly to the consumer. Farmers fear direct selling to consumers due to lack of storage facilities, distance from the market, the low shelf life of onion to hoard and uncertainty of the market in general.
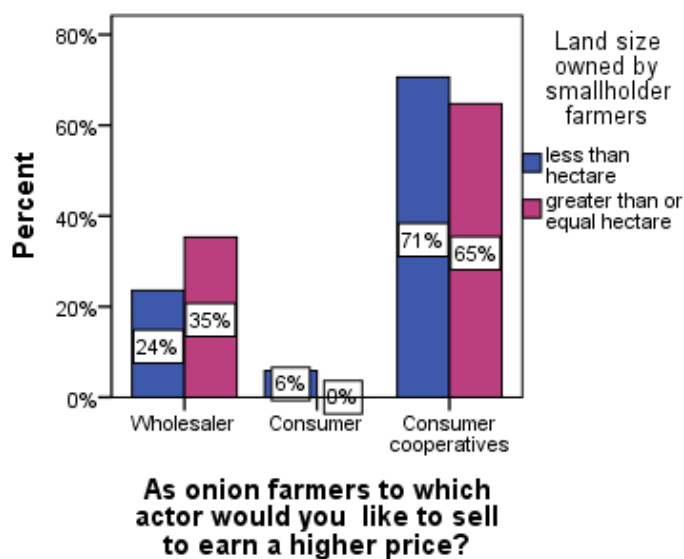
Source: Author field data

5.5.2 Contract farming

Farmers are benefiting from contract farming in getting input and technical advice for producing and marketing of onion. This approach assists farmers, especially when financial constraint occurred. Farmers share the profit obtained after covering all the production and marketing related costs with contracting body.

Figure 18 Farmers participation in contract farming

As indicated in the figure, 53% of small size farmers and 47% of large size farmers involved in contract farming. Large size farmer was not selected contract farming due to less financial constraints they have as compared to small size farmers.
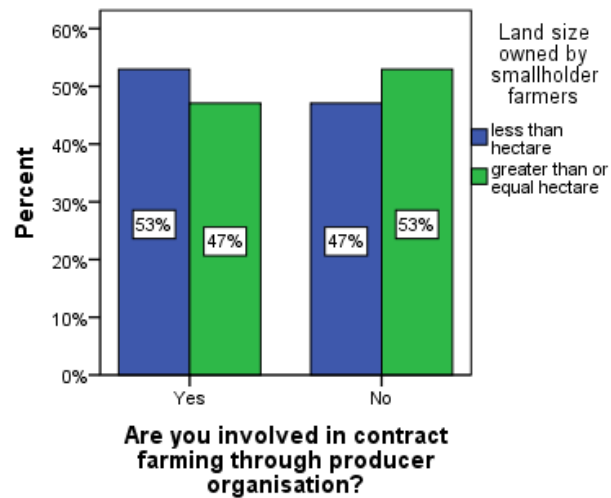
Source: Author field data

5.5.3 Producer cooperative

According to findings from IDA farmers' cooperative are not well organised and functional to operate production and marketing of onion. Currently, there are efforts from the government side to establish producer cooperatives. As an indication, for instance, the authority categorise all irrigated vegetable producing farmers into 22 farmers cooperatives. These cooperative organised to form a union for bulking of vegetable mainly onion. IDA targeted to address the marketing problem of farmers through organising them into cooperative and create linkage directly with large consumer cooperative in Addis Ababa and Adama and also with institutional buyers such as universities as well.

Figure 19 Participation of farmer as member of producers cooperatives

As indicated in the illustration below most farmers are not organised under producer cooperatives in the district, which accounts 76% for both small and large size farmers. Therefore, this indicated that the majority of farmers marketed onion privately. Only 24% of farmers organised as cooperatives in the district.

Source: Author field data

37
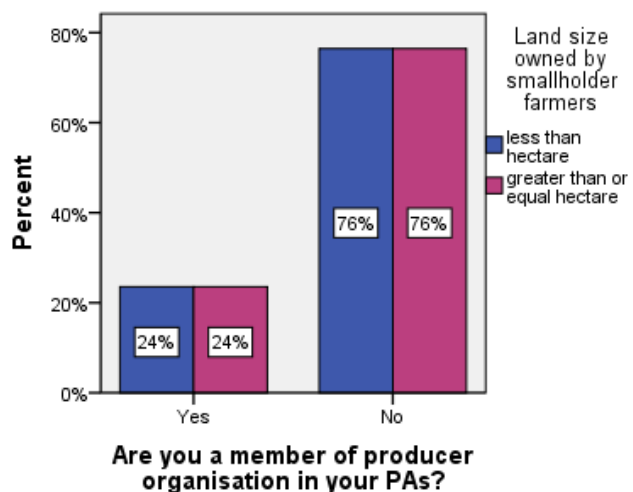
5.6 Experience from neighbouring district

Lume District is closely found to Meki-Batu Fruits and Vegetable Producing Union, which is about 40 km far. Meki-Batu union is formulated by farmer cooperative in Dugda District. Dugda district has identical agroecology with Lume District and known by its tomato and onion production as well. In Dugda, 22 farmers cooperatives provide production and marketing facilities for farmers. The cooperative bought farmers product and supply to Meki-Batu Union and the union sell to Oromia Farmers' Federation, consumer cooperative, universities and wholesalers. Meki-Batu union supplied all sources of agricultural input to primary cooperatives to sell for members of the cooperatives. The cooperatives are supplying agricultural input include fertiliser, improved seeds, pesticides and herbicides to member farmers.

This approach can be taken as a model and need to scale up to Lume District onion producing farmers. Stakeholders such as IDA and TMDO need to learn from such effectively well-functioning farmer cooperatives and union found in Dugda and can be a good opportunity for farmers in Lume as well.

CHAPTER SIX: DISCUSSION

6.1 Value chain analysis of onion

6.1.1 Key stakeholders and their functions

The research finding identified key actors in the value chain, which are input suppliers, farmer, collector, wholesaler, retailer and consumer, which is similar to findings of (Pongruru & Nagalla, 2016). According to Addisu, Lemma & Kindie (2017), studied onion value chain and identified input suppliers, producers, rural collectors, brokers, retailers, wholesalers, processors and consumers as a chain actor, which is slightly different findings compared to the result obtained from Lume. According to Pongruru & Nagalla (2016), identified chain supporters as agricultural office, microfinance, cooperatives promotion office, NGOs and transport service providers, which is the same result apart from the last three.

The stakeholder matrix is employed to discuss the main actors role in the value chain.

Table 16 Stakeholder matrix

No.	Stakeholders	Role
1.	Irrigation Development Authority/IDA	• Prepare excursions to farmers for experience sharing and adapt best practices • Introduce onion varieties when released from Research Institutes • Identify potential vegetable producing PAs in the district • Advice farmers on the application rate of seed, fertiliser and chemicals per hectare
2.	Trade and Market Development Office	• Identify the value chain actors participated • Legalise traders and brokers operating in the district • Monitor and record the daily market price
3.	Agriculture Extension Directorate and/or Agriculture Growth Program	• Provide capacity building to farmers through training • Construct rural roads and temporary shades for farmer • Strengthening the capacity of IDA
4.	Agriculture Transformation Agency	• Work in collaboration with the AED for training • Introduce new technologies/ agricultural information services hotline (8028)
5.	Microfinance Institution	• Provide credit for farmers
6.	Broker	• Assess the quality of onion and notify • Deal with farmers and purchase onion on behalf of wholesaler
7.	Smallholder farmers	• Seed multiplication and cultivate seedling • Produce onion as per the market requirement
8.	Wholesalers	• Purchase onion in large quantities at the farmgate market
9.	Collectors	• Assemble remains of onion after the main harvest sold
10.	Retailers	• Purchase onion from wholesalers

Source: Author field data

6.1.2 Value chain influencers and price setting

Brokers negotiating farmers and use different strategies to decrease the price of onion in the market. Results obtained from FGD indicates that brokers first receive an order on the amount and price of purchase from wholesaler based in Atikilt Tera market. For instance, when wholesaler order a broker to purchase 60 quintals at 7 Birr per kg, then brokers deal with a farmer to lower price (e.g. 6.5 Birr per kg) to get the margin of 0.5 Birr per kg. Brokers use their maximum power to decrease price as much as they can. This finding is in line with Getachew *et al.* (2014) who identified the role of brokers in the market is dominated by broker who further went to the extent of price fixing and managing the whole marketing process beyond their core function of brokering.

The second system that brokers use to lower price is through model farmers to influence other farmers. Brokers offer a better price for the model farmer, and the model farmer agrees to inform wrong information and tell other farmers by reducing the selling prices. As result, farmers trust model farmers and easily accepted price offered by the broker. Thirdly, brokers manipulating farmers through weighing scale. Brokers deduct 10 kg from the gross weight due to the weight of the crate as a burden. However, brokers designed a lighter crate, which approximately weighs 6 kg and still subtracts 10 kg from the gross weight as before.

The fourth mechanism brokers used is what locally called them "*defalegn*" means add extra crate for free and in, which the farmer must give extra crate freely after the truck loaded and this is not obligatory. However, the problem arises after a farmer refuses to provide extra crate of onion in which the broker switch to another farmer. During FGD farmers raised the practice of brokers as a distractive role, which affects them during selling onion.

6.1.3 Gross margin and profit share of chain actors

The gross margin for the producer is highest in channel IV (75%), and producer share of gross margin is lowest in channel I (40%). On the other hand, gross margin for traders is highest in channel I (60%) and lowest in channel IV, which is 25% share of value added. Addisu et al.(2017), exposed that the highest gross margin of producers in onion markets channels is 72.84% in which there is slight different result obtained for the case of Lume District, which is 75% gross margin.

Results from survey and case study indicate that producers get the highest profit per unit when farmers directly sell to wholesalers in channel IV (64% profit share), which is a short channel. Farmers share become lowest when farmers sell to the collector in channel I (18% profit share), which is the longest channel. The same result is reported by Addisu *et al*. (2017) who revealed that profit share was highest for producers when they directly sell to wholesalers.

6.2 Focus group discussion with farmer

The Focus group discussions with farmers explained the problems of market they are facing now and explained the traders role in the chain. Farmers identified bottlenecks, opportunities and SWOT through discussion and finally based on the discussion the proposed possible chain is prepared to benefit all actors participating in the chain (Figure, 21). During FGD farmers primarily prefer to sell onion to farmers cooperatives and the rest prefer to sell to wholesaler and collector in the market. Farmer prefers producer cooperatives as it is easier for them to access input, bulking and also when the price falls farmer directly linked to export market as there is already established railway line to Djibouti primarily.

Figure 20 FGD with farmer

Source: Author field data

Secondly, farmers also like to work with contract farmers as they have gained input, advisory services and market information from the contract farming. However, in the short run farmers firmly raised that they want to get wholesalers and want to deal with them for selling off their onion. Farmers want stakeholders such as TMDO and IDA to either legalise the activities of brokers or reduce the activities of harming farmers in the district.

6.3 SWOT analysis

The internal and external factors affecting the operation of onion value chain identified through SWOT analysis. The SWOT finding describes the internal factors, which include strengths and weaknesses and as the external factors opportunities and threats as indicated below.

Table 17 SWOT summary analysis matrix

Strengths	Weaknesses
• Sharing experiences from model farmers • Farmers skill in the multiplication of seed and seedlings • Experience sharing among farmers during farmers field day • Farmer consider onion as profitable	• Depend on a specific onion varieties /Adama red and Bombey red • Absence of product diversification • Farmers limitation of capital • Excess utilisation of fertiliser per hectare • Weak cooperation in between actors • Utilise less quality seed • Absence of shelters for onion to rise shelf life
Opportunities	**Threats**
• Existence of Research and Development Institute • Suitable agroecology condition • Existence of alternative water sources for irrigation • Location of the district • Availability of infrastructure • Government interest to develop farmers	• High involvement of brokers • Unpredictability of price of onion • Water pollution due to tannery factory • Salinity of soil • Climate change • Flooding

Source: Author field data

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6.4 Chain upgrading possibilities
6.4.1 Process upgrading

Farmers sell onion at the farmgate in the district, which helps the farmer to reduce information and transport costs and other market-related costs as well and fasten the speed of delivery of onion for consumers. Farmers are delighted if they meet wholesaler without a broker to sell their onion at the farmgate market. On the other hand, farmers utilise intensive chemical, fertiliser and seed per hectare hoping that production increases. However, this incurs a high cost for farmers and also affects the soil in the long run and make production to decrease. For example, IDA is recommending IPM than using pesticide chemicals. Therefore, a continuous awareness is necessary in this regard to be able to help farmers reduce the practice of intensive utilisation of input.

6.4.2 Product upgrading

According to Pongruru & Nagalla (2016), revealed that Adama red and Bombey red seed bulb yield is from 300-400 qt/ha and this finding is higher than the result obtained from survey result, which is 262 qt/ha or 26.2 ton per ha. According to the (MoANR, 2015), the national average of onion bulb yield is 10.5 ton per ha which is lower than the study finding. According to Pongruru & Nagalla (2016), identified the suggested amounts of onion seed is 3.5-4 kg/ha but in the study area farmer use 8 – 10 kg/ha of onion seed.

Farmers can improve the selling value of onion through organically produced onion to benefit from a niche market. Supermarket in Addis Ababa demand organically produced onion, but farmers are focusing on the conventional production system. The practice of using similar onion seed repeatedly on the same land is observed, which affects the productivity. The survey indicates that a given farmer expends up to 110, 040 Birr to cultivate onion per hectare, which is expensive if the selling drops below production cost in the market. Product diversification is also uncommon in the district in which stakeholders are expected to provide extension services to the farmer to diversify risks in case the price falls the other crop might compensate.

6.4.3 Function upgrading

The broker power is seen as a source of all marketing problems. Brokers play an intermediary role in linking farmer with traders, especially wholesaler. During FGD, the farmer explained that usually, brokers are standing on the side of wholesalers for reducing the selling price of onion. Brokers get an advantage in weighing and further reducing the actual market price for the sake of own benefit. As a result, farmers want to deal directly with wholesalers to sell onion.

During onion harvest period farmers search for a better market for gathering market information for selling onion at a better price. However, farmer mostly gets information from brokers. Brokers tell a distorted market price information in which the farmer especially those who do not have cell phone accept that wrong information and agree with brokers for selling their onion at a lower price, which is a chronic problem raised by farmers during FGD. ATA started a digital technology platform for farmers in the remote area to get information by using a cell phone and calling directly to a specified number (8028) for asking any agriculture-related information. However, this technology is not familiar with farmers, and most of them have no idea of this technology. The agriculture extension needs to work to disseminate this technology to farmers. Furthermore, TMDO and other stakeholders have a role in addressing the information gap. They can inform farmers through using billboard display at marketplaces and directly telling farmers through DAs.

6.5 Business models for linking small-scale farmer to a high price market
6.5.1 Short chain

Farmers profit share is high in channel IV and V compared to channel I, II and III, which indicates that the farmer profit share increased as the chain gets shorter. In both channel maximum of 64% and 42% of profit per unit is recorded for channel IV and channel V, respectively, which indicates in the short run a short chain model can be an alternative for farmers to reach end market and sell onion at a reasonable price. For realising this, stakeholder participation is essential to enable farmers to sell for wholesalers without brokers interference is needed. Interview with IDA indicates that farmers can sell their onion directly to consumer cooperatives in the major cities such as Addis Ababa, which is a good opportunity for farmers to link with the institutional buyers such as universities and cooperative consumers.

6.5.2 Contract farming

Contract farming assists farmers in addressing the marketing problem through getting market-related information from contracting body. Few wholesaler based in Modjo provides credit, input and market-related information through contracting farmers to produce onion. During FGD farmers raised that contract farming helps them to cover financial gaps temporarily. Moreover, an investor who participates in contract farming are educated people and have an agriculture background, which is an opportunity for farmers to take a lesson on production and marketing of onion. Interview with supermarket shows that currently, it is hard to obtain a supply of organic onion in the market as all farmers produce inorganic onion type. Therefore through contract farming, it is possible to link organic farmers with supermarkets which enable farmers to access niche market of onion and this kind of contract benefits both farmer and trader.

During an interview with IDA, contract farming in the district is practised in a way that farmer is not benefited from cultivating onion in their own land. For instance, if the farmer rents all his land to an investor, then the investor employ the farmer to take care of the onion until harvest time. Due to this, some farmers prefer renting their land than producing, as the price of land is expensive in the area. This situation created a dependency of farmers on this external investors. Accordingly, IDA has to design a formal contractual agreement to make farmers benefit from contract farming.

6.5.3 Producer cooperative

Interview with IDA indicated that formulating of producer cooperatives and collaboration among all stakeholders is important to realise a farmers' cooperative and solve the existing marketing problems. According to IDA, producer cooperatives are important in delivering of input to farmers and marketing of onion. Therefore, IDA and AED have to support the cooperatives through training and capacity building. The cooperatives can bargain price and sell to institutional buyers such as universities and large consumer cooperative found in Addis Ababa which can be realised through actively involving stakeholders such as IDA, AED and Agriculture Cooperative Agency and actors found in the major cities of Addis Ababa and Adama. This finding is supported by Getachew et al. (2014), noted that organising farmers into cooperative has created a capacity to produce and solve the financial constraints of smallholder farmers and achieve economies of scale.

CHAPTER SEVEN: CONCLUSIONS

The research objective was to identify appropriate market linkages and strategies that can be introduced by the Agricultural Extension Directorate/AED that enables Lume District farmers to access better prices of onion in the market. This eventually entails addressing the two main research questions. Accordingly, this section presents the conclusion about the existing structure of onion value chain and the market linkages and strategies to smallholder farmers to obtain a better or higher price.

7.1 Existing structure of onion value chain

Onion production in Lume District comprises several stakeholders with different functions. The study identified key stakeholders, which include input suppliers, smallholder farmers, wholesalers, collectors, retailers, supermarkets and consumers as chain actors; whereas Agriculture Extension Directorate, IDA, TMDO, Small and Micro Finance Institutions, ATA and brokers as a chain supporters. These stakeholders are key players in the onion value chain, where they have different roles as an actor and supporter in the chain.

Five marketing channels were identified in the study area, and among these, Channel III is identified as the dominant channel in terms of volume of onion distribution that accounted 64%, followed by channel IV which held 21% of the volume. Channel V is the least dominant channel accounted 3% of the total volume of onion sold to the market. Channel III and channel IV score the highest share of volume distribution because wholesalers can purchase in large quantity. Wholesalers buying onion are based in Addis Ababa, where there is a large volume of onion demanded and consumed. Channel I, II and V are smaller in volume distribution because collectors and retailers have lower financial capacity and supply, mainly to the local consumers of Modjo and Koka towns, where very small proportion of consumers found as compared to Addis Ababa.

In terms of profit sharing, producers get the highest profit per unit in a situation where farmers directly sell to wholesalers (64% profit share), which is one of the shortest channel. On the other hand, profit becomes lowest when farmers sold to collectors (18% profit share), which is the longest channel. The gross margin or value share for producers is highest in channel IV which is 75%, and producer's share of gross margin is lowest in channel I, which becomes 40%. The share of gross margin for traders, however, is highest in channel I, which is 60%, while it appears lowest in channel IV, which is 25%.

The governance structure of onion is a spot, or market type where farmers sell at their farmgate market and farmers have alternative possibilities to sell onion such as for wholesalers or any other actor in the market. From the key chain operators, wholesalers and brokers have the ultimate power in the market to assess or rank the quality and determine the price of onion. Input suppliers also influence in delivering seeds, chemical and fertilisers to the farmers based on demand. The Agriculture Growth Program of the AED and IDA are the major and key supporters of farmers in the chain. Furthermore, micro-financial institutions play a pivotal role in providing credit services to smallholder farmers.

The sustainability of onion production and marketing was also observed from the 3p (people, planet and profit) perspectives. From a people point of view, infrastructure (rural roads and health facility) is still inadequate in the remote part of the district. The other major identified sustainability challenges correspond in line with the views of pollution of water, soil salinity and intensive application of input (seed, chemical and fertiliser). Modjo hides and skin processing factory/tannery found to highly pollute the river water, air, and soil, which in turn affects the public health status and reduce the productivity of farmers' produce. When viewed in terms of profit, smallholder farmers are price

takers, and the majority of farmers get market price information from brokers as they have no alternative source of information and lack of stakeholder support.

7.2 Market linkages and strategies to smallholder farmers

The major market characteristics identified during field study include price fluctuation, weak vertical and horizontal linkage in the chain, absence of standard measurement unit and limited use of market information. Information is vital to sell onion at existing market price. However, farmers are exposed to the unreliable information source. For instance, results from the survey indicated that brokers are the main information source, which accounts 85% for farmers followed by other farmers accounted 9% as an information source for farmers about selling onion in the market.

Smallholder farmers in the study area faced hindering factors, which include price fluctuation of onion, high involvement of illegal brokers, river water pollution, absence of storage facilities, shortage and high cost of input, high maintenance cost for motor pump, absence of farmers' cooperatives and practice of producing identical products at the same time/no diversification. On the other hand, the key identified supporting factors such as availability of infrastructure facilities, existence of river, dam and groundwater, proximity to a big market including Addis Ababa and Adama,which are located closer to railway line connecting Ethio-Djibouti, availability of microfinance institutions and existence of research institute at Adami Tulu and Awash Melkasa.

Farmers in the study area spend 4.2 Birr to produce one kg of onion and to cultivate onion on one hectare spends more than 100,000 Birr, which shows farmers spend high cost of production unless compensated through selling at a higher price in the market. Here, farmers can reduce the production cost if they use inputs mainly chemicals and seeds based on agronomist recommendation. The speed of delivery is fast as the geographic location of the district itself is convenient to channel onion to the Addis Ababa and Adama markets easily. Farmers usually prefer to sell at farmgate market as they often have no storage at big marketplaces like Atikilt Tera.

Farmers get low access to onion seed variety and repeatedly use same seed types, which are Adama red and Bombey red in the study area. Using old seed reduces productivity and affects the quality of onion which in turn hinders farmers to claim higher price in Atikilt Tera market. Farmers usually produce and become uncertain of the prices as other external factors determine the price of selling onion. Safeguarding and avoiding the volatility of price in the market can be realised through upgrading the chain and making sure that every actor and stakeholder is coordinated to link onion produce to the existing higher price domestic market and that of the export market.

Short chain, contract farming and producer cooperative can be a wayout and identified as a viable business model to integrate onion producing farmers to a better and higher market prices and possibly domestic and overseas market. For instance, for the case of Meki-Batu Union producer cooperative found in the neighbouring district shows that bargains price and influences other traders in the market, which can also be a good experience to be scaled up at Lume District.

CHAPTER EIGHT: RECOMMENDATIONS

To realise market linkages for farmers to access a better and possibly premium market, it needs cooperation among different stakeholders. Accordingly, recommendations were given to the value chain supporters for an intervention.

8.1 Agriculture Extension Directorate

- Capacitate local input suppliers through linking them directly with importers to deliver input timely for farmers performed by AED and IDA.
- Intensive training for farmers to reduce over utilisation of input especially fertiliser and onion seed to meet market requirements in collaboration with IDA.
- Strengthen producer cooperatives and large-scale farmers through creating market linkage with consumer cooperatives in Addis Ababa and exporters as well.
- Prepare an excursion for a farmer to share the experience of currently working producer cooperative from Meki-Batu Union with the facilitation of IDA.
- Creating a linkage with universities through contract agreement facilitated by IDA and AED for sourcing onion.
- Constructing collection centre for onion to producer cooperatives to be able to make consumer cooperative directly source onion from collection centre, which can be facilitated by IDA and TMDO. Here, AED assists in constructing of collection centre for producer cooperative.
- AED with DTMDO provides training for brokers to create awareness before licensing/ organising them.

8.2 Irrigation Development Authority

- AED capacitate IDA through training and staffing to be able to provide efficient extension service delivery to farmers.
- Communicating with the already established large consumer cooperative in Addis Ababa to source onion from farmers which can be handled by IDA.
- Organising of the farmer to formulate producer cooperatives through the facilitation of IDA, cooperative agency and other concerned agency.
- Establishing standardised contract enforcement mechanism which helps to facilitate onion market transaction and support contracting body to benefit from the contractual agreement. AED assist in the preparation of the detailed structure of contract for IDA.
- Contracting consumer cooperative/union with the producer cooperative or large-scale farmers and monitoring the contract that has been signed which is performed by IDA.

8.3 Trade and Market Development Office

- Staffing TMDO to be able to facilitate and regulate trade activities effectively. Here, AED helps in the staffing process.
- Legalise and monitor brokers where AED helps through creating awareness for brokers through training.
- Organise brokers as a group enterprise or individually license and train them to abide trade rules and regulations in collaboration with AED.
- Developing a standard quality grading criteria for onion at the local level, where AED help through capacitating TMDO to facilitate the process.

- Proper registration of traders in the district and closely monitoring their activities in the market through follow-up of the activities.
- Organising wholesalers as vegetable trader association and link with credit facilities, and this can be performed by TMDO with the help of AED. Make sure the trader association source supply directly from a farmer.

8.4 Agricultural Transformation Agency

- Promote the already developed agricultural information services hotline (8028) for farmers including the way to use as only a few of the farmers aware of and used the technology. AED assist ATA in the process of implementation.
- Incorporating current market information on selected crops on the hotline services (8028).
- Providing capacity building and training for IDA and TMDO experts at the district level.

8.5 Proposed value chain map to link farmers to higher price market

The proposed chain map was prepared as a strategy of creating viable linkage for farmers. Percentage of volume distribution, selling prices and profit share for the selected channel is estimated to show the viability of the chain. As indicated in the map it is recommended to establish producer cooperatives and link them to consumer cooperatives in Addis Ababa and Adama which can be done by IDA and AED beside the establishment of a cooperative. However, in the short run, large size farmer can be linked directly to the consumer cooperatives through the facilitation of IDA.

Figure 21 Proposed onion value chain map
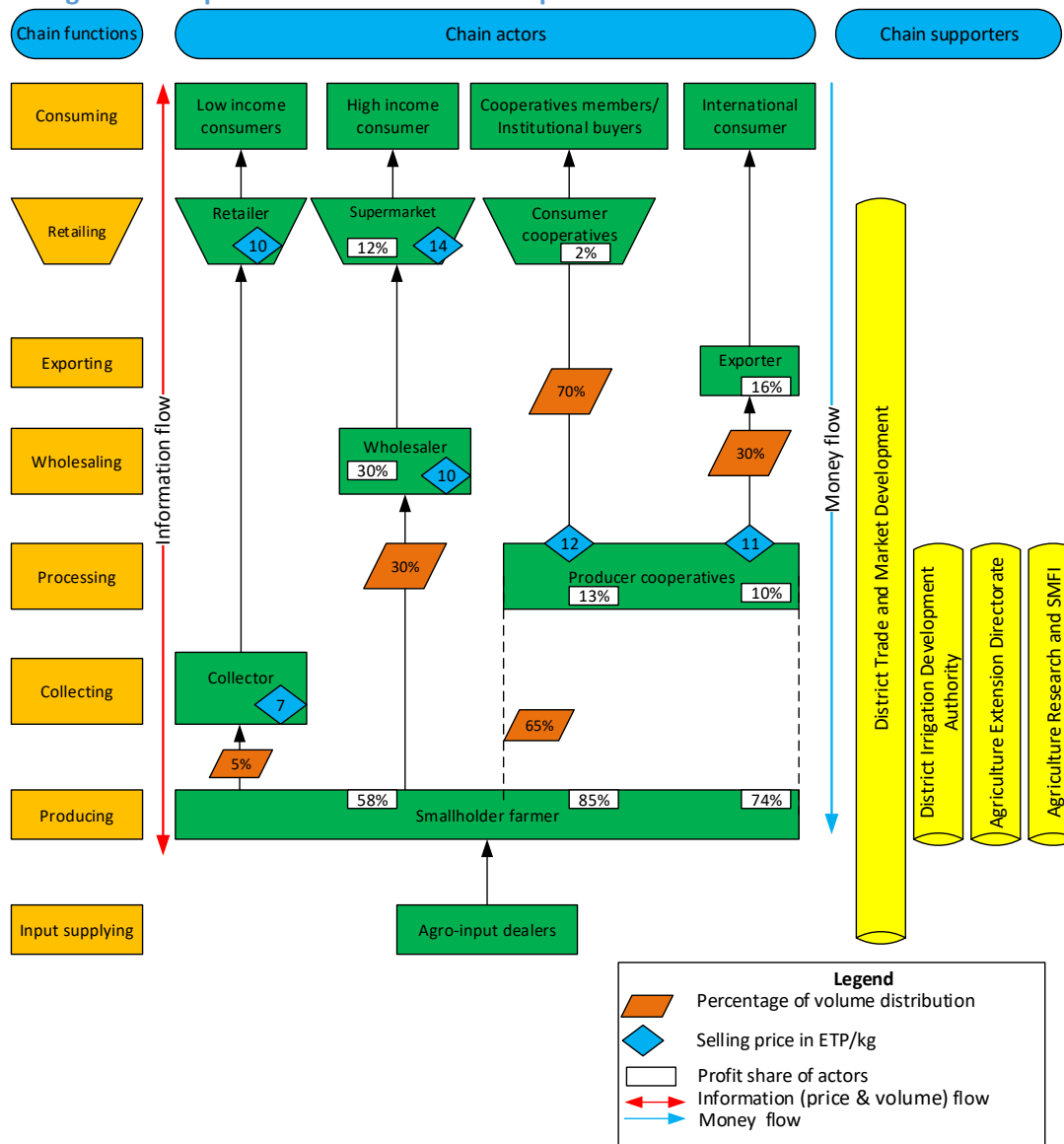
Source: Author field data

Future Research

The following issues have been suggested for the future researchers to undertake to facilitate and develop capability and share of farmers in the market. It is recommended that future research on the following issues.

- Assessment of current market information sources to find alternative ways of disseminating market information for farmers.
- The contribution and effects of contract farming and microfinance in the production and marketing of onion for the farmer.

The transcript of field data of the research can be found in the hands of the Author and can be available if requested through author email[5].

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CHAPTER NINE: REFLEXIVITY

This research aimed to assess the market linkages and strategies for smallholder farmers in Lume District as partial fulfilment of the requirement for MSc in Agricultural Production Chain Management, specialisation in Horticulture Chains. The field research I did was a challenging but at the same time learning, which remains a good experience as a value chain practitioner and facilitator. Before launching of the main fieldwork, I had a working break with my family for three days, and then I began preparing myself for fieldwork based on my research plan and guidance of my supervisor.

The study area is 73 km far from the city of Addis Ababa where I was residing with family. It takes only 40 minutes travel from Addis Ababa to Modjo town using a car. As per the plan, I went to concerned local government authority to introduce myself and reason of my presence and finally, discuss the situation of the area. I went to the appropriate office to hand over my official letter to indicate the reason for my attendance. As a staff of the Ministry of Agriculture, I had experience in a research survey project on farmers and know-how which government organs have the mandate to handle my research project at the district level. Unfortunately, I could not find the particular person with authority on the first day I went to the government office as the head was not around. But, I was lucky to find the delegated person and have spoken to the representative and thus managed to handover my official letter explaining the objective of my presence. Following the discussion, the representative explained that they are glad that the topic of my study was one of the core problems the office tried to tackle and they are happy to having me and interested in the subject matter. This was a good opportunity for me and delightfully felt that I am going to contribute to one of the problems farmers faced and excited to play a role as a chain facilitator and value chain practitioner.

As the survey was conducted, the country was in a state of emergency and movement after 6 pm was strictly prohibited with a passenger car. However, the first discussion with the Acting Head of Irrigation Development Authority at the district assisted me to review the schedule and contextualise it with the existing local situation. I have requested support letter from District Offices, and they wrote the letter to each sampled Peasant Associations/PAs before starting the fieldwork, which was important in facilitating the field research process. The impact of the state of emergency was not only strange to my experience, but it was also challenging as farmers were mostly available either in the morning or afternoon time. Thus, I tried to finish my interview in the afternoon before 4:30 pm and get back to my guest house. I transcribed my data and checked the reliability against my observation and informal discussions with experts and other farmers till midnight.

As an outsider to the farmers, the Officers and Development Agents/DAs played a pivotal role in facilitation and explaining the reason of my presence. Also, the District Office assigned one subject matter specialist/SMS to introduce me with those selected PAs. There are DAs within those PAs who have been in contact with farmers on a daily basis. Hence, the DAs assisted me in the selection process of the farmers for the study. DAs were supportive despite their busy schedule as the survey time was overlapping with a main cropping season of farmers. Besides, there was rain daily, and always I had to wait in the morning till the rain stops. Eventually, I got the opportunity to visit farmers at their farm places in the afternoon. I usually greeted them according to the local norms and introduced myself with a local language and managed to establish trust and smooth communication. I often started with asking for the consent of the farmers by explaining that the collected information is confidential and utilised only for a research purpose. Most farmers are happy to give genuine information as they are victims of the marketing problem. Majority of the farmers were cooperative to participate in the study and thus supplied a reliable information during the survey and focus group discussions/FGD. I was also stunned as the farmers were eager and expected the problem to be addressed very soon through the government. In such cases, I had to explain that this study is part of efforts to address challenges

in the market strategically, where the existing problem, no matter how long it might take, can be solved through actively involving every concerned stakeholder.

Few farmers were also expecting cash payment for an interview. This was the first time I faced such encounter where I tried to further explain for the farmers the fact that participation in the research does not involve payment, and should they decide to participate, it is entirely based on their free will, mainly considering the study purpose and their valuable contribution to this effect. Finally, I learned that such demands emerged following incidences where some researchers and organisations were paying farmers for participation in an interview. This trend was a new scenario, which I believe has to stop as farmers expect payment for an interview and such claims would jeopardise research initiatives in the future.

During the FGDs, some farmers have tried to dominate the discussion, and in the middle of the session, some others were discussing the issues sideways. Even though it was tough to manage such challenges sometimes, particularly in traditional communities where some individuals might have a norm to speak first or on behalf of the others, I managed to systematically interrupt the discussion and politely tried to give and let the chance for other participants express their views as well. Furthermore, female farmers were shying to speak in front of male farmers for an interview, which I realised while conducting FGD. Having this information, I understood to organise a separate session to female farmers, which I found helpful to the research to have a deep insight of the situation in the area of gender dynamics.

After completion of surveying farmers, I had an interview scheduled with traders, and at that time the customs authority imposed high tax estimation on lower level traders, and consequently, traders were complaining of this. However, the government was insisting and trying to convince traders to pay the lump sum of estimated tax. Hence, I was trying to collect data in such a heightened time; I faced a challenge of trust to get trader for an interview where they preferred to hiding themselves as if I were from the government side with the intention to register their daily income and expense for tax purposes. I thoroughly explained the situation and introduced myself for the traders to be able to establish trust and avoid their biases. Unfortunately, traders had a culture of hiding facts and refrained to giving accurate data as most of them are illegal traders, where the situation was further aggravated by the then government decision of imposing heavy estimation on the daily income of traders, which they translated to inflate tax.

I have collected the required information from wholesalers who worked closely with farmers in contract farming. I later realised that they had given me a genuine information on what is going on from the side of traders. During stakeholders' interview, I raised questions concerning traders to validate and triangulate the data and to be able to reduce the level of biased data provided by traders. To this effect, I tried to rescan information collected from traders and transcribed it through triangulation to minimise the level of error, which eventually adds credibility of the data gathered from traders side. The data was systematically transcribed and analysed, where the outcome of the research benefits stakeholders involved in the chain in informing the existing situation of actors and supporters. The research finding also recommends areas that need improvement and intervention among other.

I realised and learned while conducting FGD female participants are dominated and remain passive and needs a separate session to get their deep insight in the future. Moreover, for the case of traders, experts from trade office are an appropriate source as they regularly monitor the activities of every single trader and can possibly collect or provide more reliable information.

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Activities	Milestone	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Date	19 June	26 June	3 July	10th July	17th July	24th July	31st July	7th Aug	14th Aug	21st Aug	28th Aug	4th Sep	11th Sep	18th Sep
Prepare concept note and background information	• Introduction about onion • Brief about onion with related to problem on the producers		√	√												
Prepare literature Review	• Explain about onion value chain • Discuss the marketing aspects of onion in Ethiopia		√	√												
Prepare research context and methodology	• Explain which research strategy utilised • Discuss method of data gathering techniques		√	√												
Prepare questionnaires and checklist	• Prepare questionnaire for farmers • Prepare checklists for collectors, wholesalers and consumers • Prepare checklists for facilitators (Irrigation Development Authority, trade office)		√	√												
Finalising thesis proposal, including conceptual framework	• Prepare the final proposal • Preparation departure for field work			√												
Departure for field work to Ethiopia	• Prepare necessary document and equip with every logistics before departure				√											
Discussion with Lume District Agriculture Office for selecting appropriate Peasant Association (PAs)	• Handing a letter to officials to ask permission to conduct research, and select appropriate PAs • Ask on expert from agriculture office as a coordinator to assist the main researcher					√										
Pilot survey	• Conduct pilot survey in the study areas to make adjustment and probably amend the questionnaire before duplicating the final version for an interview					√										
Surveying in farmers	• Collected data from farmers based on survey questionnaire. • Verifying the gathered information and improve for the next day to fill properly.					√	√									
Conduct standardised open-ended interview in Modjo and Addis Ababa	• Gather data from actors include collectors, wholesalers and retailers in Modjo town • Collect data from IDA, TMDO and ATA						√	√								

Activities	Milestone	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Date	19 June	26 June	3 July	10th July	17th July	24th July	31st July	7th Aug	14th Aug	21st Aug	28th Aug	4th Sep	11th Sep	18th Sep
	• Collecting data from wholesalers and retailers from Addis															
Data encoding, analysing and processing into the computer	• Coding and encoding data in SPSS version 20 • Analysing and processing the data								√	√						
Back to VHL	• Return from field work to VHL										√					
Results, discussion and further literature review	• Writing the report based on gathered data • Finding supplementary information to back the research findings with previous authors • Finding viable alternative marketing strategies to adapt for small-scale farmers											√	√	√		
Conclusion and recommendation	• Conclude based on the findings of main research questions • Recommend based on objectives of the research												√	√		
Edit the paper	• Edit paper based on comment delivered												√	√	√	
Finalise the paper	• Edit further for the quality of the paper • Checking thesis thoroughly against all research questions														√	
Final thesis submission	• Submit final thesis (Friday 8 Sept)														√	
Defence	• Prepare for defense (14 - 20 Sept)															√

Appendix 2 Questionnaire for smallholder farmers

Date of interview (dd/mm/yr) _____/_____/_____   Kebele name _____

Use this general codes[6]
-888 = Not applicable
-999= Missing value

1. Respondent Name: _____.
2. Respondent's age _____.
3. Respondent gender   1= Male   2= Female
4. Educational background
    1= Illiterate   2= Informal education   3= Primary education
    4= High school   5= Certificate & above
5. What is the size of your family as a household?_____.
6. How long have you practiced production of onion products? _____years.
7. Where is the source of fertiliser for onion?
    1= Own   2= From market   3= Neighbour
    4= Cooperative association /union   5= other (specify)_____.
8. Where is the source of seed for onion?
    1= From market   2= Cooperative association /union   3= Research Institute
    4= other (specify)_____.
9. Do you know about the market requirements for onion?
    1= Yes   2= No   3= I am not sure
10. If yes for Q. 9 above what are the market requirements? _____.
11. How do you meet the market requirements as stated on Q. 10? _____.
12. What is the distance from the farm to the marketplace for onion?
    1= Less than 10 km   2= 11-20 km   3= 21-40 km   4= Above 41km
13. Do you obtain a market price information before selling your onion?
   1= Yes   2= Sometimes   3= Not at all
14. If yes for Q. 14, who is the source of information?
    1= Producer organization (PO)   2= Broker   3= Other farmers
    4= Agricultural information services hotline (8028)   5= Radio   6= Other (specify)_____.
15. Who determines the price of onion in the market?
    1= Farmer   2= Broker   3= Wholesaler   4= Don't know
    5= Other (specify) _____.
16. Are there a practice of quality specification for onion?   1= Yes   2=No
17. If yes for Q. 16 who defines the quality or technical specification of the products?
    1= Collector   2= Consumer   3= Wholesaler   4= Retailer
    5= producer cooperative   6= Brokers
18. Are you a member of cooperative association in your Kebele/Woreda?   1= Yes   2= No
19. Are you participated in contract farming through cooperative association?   1= Yes
        2= No
20. How do you rate your satisfaction level with the price offered for onion in the market?
    1= Highly dissatisfied   2= Dissatisfied   3= Satisfied
    4=Moderately satisfied   5=Highly satisfied
21. Who is providing extension services for farmers in the production of onion?
    1= Government agriculture extension unit   2= NGOs   3= Other (specify)_____.

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[6]"Not applicable" is utilized whenever the question is not relevant or not applicable for the respondent, "Missing value" refers to a situation where a respondent unable or not-willing to answer the question.

22. What kind of value addition activities you performed?

    1= Sorting   2= Grading   3= Packing   4= Other (specify)_____.

23. Where do you sell your onion?

    1= Farm gate market   2= Assembly Market   3= Wholesale market   4=Retail market

24. To whom do you sell onion?

    1= Collector   2= Wholesaler   3= Retailer   4= Consumer   5= Cooperatives

    6= Others (specify)_____.

25. Why do you select this channel (based on answer for Q. 23)?_____.

26. What quantity of onion supplied through selected channels (based on Q. 23)?_____.

27. Which channel benefit you as onion farmers to earn a higher price in the market?

    1= Collector   2= Wholesaler   3= Retailer   4= Consumer

    5= Consumer cooperatives   6= Others (specify)_____.

28. Please answer questions on the irrigated onion to capture production costs.

Item	Unit of measurement	Amount	Unit cost	Total cost
Land used for onion cultivation	Kert[7] or ha			
Seed quantity	kg			
Seedlings	seedbed			
Price of seed	Birr/kg or Birr/gm			
Cost incur for seedbed /seedlings	Birr/seedbed			
Labour used in land preparation and ploughing	Number			
Labour for watering and weeding cultivation	Number			
Labour used for harvesting	Number			
Average price for labour	Person-days (LMD)			
Oxen days for ploughing	Timad[8]/chimdi			
Oxen day	Price/day			
Amount of Fertilizer (DAP, UREA)	Kg			
Price of fertiliser	Birr/Kg			
Organic fertilizer used (manure/compost)	Kg			
Price of organic fertiliser	Birr/kg			
Amount of fungicide used	Kg			
Price of fungicide	Birr/kg or Birr/gm			
Amount of insecticide used	Litre			
Price of insecticide	Birr/Ltr			
Transport cost	Birr			
Freight cost	Birr			
Market information cost /telephone/	Birr			
Land value (if rented) or use local rent)	Birr			
Price of Motor pump	Birr			
Other expenses (maintenance, fuel)	Birr			
Total output quantity	quintals			
Quantity sold	Kg			
Selling price	Birr/kg			

29. What are the major hindering factors in onion marketing?

30. What are the major supporting factors for onion marketing in Lume?

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[7] Kert- indicates land size and one kert is a quarter or one fourth of a hectare.
[8] Timad- is indicating oxen days for ploughing onion land.

Appendix 3 Checklist for collectors

1. Where do you purchase onion?
   1= Farmland (spot)   2 = At warehouse
   3 = Other (specify)_____.
2. As a buyer, is there a difficulty in obtaining sufficient, timely and quality supplies?
3. Is there a strong trust and cooperation evident among collector?
4. Is there a strong confidence and collaboration between farmer and collector?
5. Do collector have rules and regulations to follow in buying or selling onion?
6. Do producers expected to meet a particular product quality?

7. How much quantity (kg) or quintals of onion bought?	
8. What is the purchase price/kg?	
9. What is the storage cost (Birr/kg) or Birr/quintal?	
10. What is the loading/off-loading cost?	
11. What is the wastage loss (kg)	
12. What is the cleaning, sorting, grading cost?	
13. What is the packaging cost (Birr/ kg)?	
14. What is the transport cost (Birr/ kg) or Birr/ quintal?	
15. What other expenses incurred?	
16. How much quantity (kg) or quintals of onion sold?	
17. What is the selling price (Birr/ kg)?	
18. To whom did you sell onion?	

Appendix 4 Checklist for wholesalers

1. Where do you purchase onion?
   1= Farmland (spot)   2= Collector   3= Cooperatives   4= Other (specify)_____.
2. As a buyer, is there a difficulty in obtaining sufficient, timely and quality supplies?
3. Is there a cooperation between farmer and wholesalers?
4. Do producers required to meet a specified product quality or standard?
5. Do wholesaler have contract producers? (Yes/No)
6. If Yes what are the services provided to contract farmers?_____.
7. Do you have a warehouse   1= Yes   2= No

8. How much quantity (kg) or quintals of onion bought?	
9. What is the purchase price/kg?	
10. What is the storage cost (Birr/kg) or Birr/qt?	
11. What is the loading/off-loading cost?	
12. What is the wastage loss (kg)?	
13. What does the cleaning, sorting and grading cost?	
14. What is the packaging cost (Birr/ kg)?	
15. What is the transport cost (Birr/ kg) or Birr/ quintals?	
16. What other expenses incurred?	
17. How much quantity (kg) or quintals of onion sold?	
18. What is the selling price (Birr/ kg)?	
19. To whom did you sell onion?	

Appendix 5 Checklist for retailers

1. From whom do you bought onion?

   1 = Farmland (spot)   2 = Collector   3 = Cooperatives

   4= Wholesalers   5 = Other (specify)_____.

2. As a buyer, is there a difficulty in obtaining sufficient, timely and quality supplies?

3. How do you explain the characteristics for onion market (excess supply, price fluctuation) ?
   _____.

4. How much quantity (kg) or quintals do you buy?	
5. What is the purchase price/kg?	
6. What is the storage cost (Birr/kg)?	
7. What is the loading/off-loading cost?	
8. What is the wastage loss (in kg)?	
9. What does the cleaning, sorting and grading cost?	
10. What is the packaging cost (in Birr/ kg)?	
11. What is the transport cost (in Birr/ kg) or Birr/quintals?	
12. What other expenses incurred?	
13. How much quantity (kg) or quintals of onion sold?	
14. What is the selling price (in Birr/ kg)?	
15. To whom did you sell onion?	

Appendix 6 Checklist for supermarkets

1. From whom do you bought onion?
   - 1 = Farmland (spot)   2 = Collector   3 = Wholesalers
   - 4 = Other (specify)_____.
2. As a buyer, is there a difficulty in obtaining continuous, sufficient, timely and quality supplies?
3. Is there a cooperation between onion sellers and supermarkets?
4. Do producers required to meet a specified product quality or standard (yes/no)? If yes what kind of standard farmers has to meet?

   _____
   _____.
5. Is there a consumers demand for organic onion in your supermarket?
6. In the future do you buy organic onion at premium price, if farmers are producing?

Appendix 7 Checklist for Irrigation Development Authority

1. What are the key actors involved in onion marketing?
2. What are the conditions of accessibility of roads, means of transport and storage facilities in the onion marketing?
3. Explain the role of actors and which actors do play a crucial role (influence) in the onion marketing? Why?
4. What is the role of stakeholders (chain supporters and influencers) in the onion marketing?
5. What are the seasons of onion production and explain the months that prices are lowest and highest in the onion marketing?
6. Who is benefited or affected by the price in the onion market?
7. How your organisation supports onion farmers?
8. What are the market requirements for selling onion?
9. Is there an initiative to find out the alternative market channel for onion producers?
10. What are the hindering and supporting factors affecting onion marketing?
11. Is there a contract farming practices and what kind of technical assistance provided to farmers?
12. What needs to be performed to protect and secure the sustainability of onion production (use of an application of fertiliser per hectare, seed and chemicals)?
13. What are the strengths and weaknesses in the onion marketing?
14. What are the opportunities and threats in the onion marketing?

Appendix 8 Checklist for Trade and Market Development Office

1. What do the key players participate in the value chain of onion?
2. What are key stakeholders engaged in the onion value chain?
3. What are the seasons of onion production and explain the months that prices are lowest and highest in the onion marketing?
4. Who is benefited or affected by the price in the onion market?
5. What are the main characteristics of the market for onion?
6. Is there an initiative to find out the alternative market channel for onion producers?
7. Which actor influences the chain? How?
8. What could be the role of stakeholders to improve the benefit of farmers in the value chain?

Appendix 9 Checklist for ATA value chain expert

1. What does your organisation suggest to tackle the challenges faced and upgrade the chain to increase the share of farmers in the value chain of onion?
2. Which is market linking strategies suitable to farmers to fetch higher market prices (short chain, contract farming, cooperative union)?
3. Which business model (such as intermediary driven, buyer-driven or producer driven or any other) is viable for farmers to get higher market prices for onion?
4. What do you think the market strategies necessary to improve market regarding product, price, place and promotion?
5. What needs to be performed to protect and secure the sustainability of onion production (use of fertiliser, seed and chemicals)?
6. What are the chain upgrading possibilities (process, product and functional) in the onion marketing?

1. How do you tackle the problems encountered in the onion marketing?
2. How do you explain the role of farmers cooperatives in the onion marketing?
3. What types of support do you obtain from agriculture extension services?
4. Which actors influence the price of onion and how do you explain the function of brokers in this regards?
5. What are the strengths and weaknesses in the onion marketing?
6. What are the opportunities and threats in the onion marketing?
7. What are the participants the way forward points to be able to sell onion at a higher price in the market?

Appendix 11 List of respondents during field survey

No	Name	PAs/Kebele
1	Sorecha Negash	Ejersa Joro
2	Kisu Bulbula	Ejersa Joro
3	Tigist Hassen	Ejersa Joro
4	Sida Tufa	Ejersa Joro
5	Merga Chala	Ejersa Joro
6	Ejersa Lafto	Ejersa Joro
7	Sarja Takila	Ejersa Joro
8	Dagu Kello	Ejersa Joro
9	Takila Negash	Ejersa Joro
10	Chala Jima	Ejersa Joro
11	Balcha Galato	Ejersa Joro
12	Teyila Hawase	Ejersa Joro
13	Birbirsa Raya	Dungugi Bekele
14	Begna Tila	Dungugi Bekele
15	Sisay Balcha	Dungugi Bekele
16	Degaga Telila	Dungugi Bekele
17	Abel Lonuni	Dungugi Bekele
18	Alamu Abishu	Dungugi Bekele
19	Shambel Assefa	Dungugi Bekele
20	Dame Tufa	Dungugi Bekele
21	Tadesse Bekele	Dungugi Bekele
22	Jima Hawas	Dungugi Bekele
23	Lammi Dadi	Dungugi Bekele
24	Tafa Nadi	Koka Negewo
25	Sisay Adisu	Koka Negewo
26	Ebrahim Jemal	Koka Negewo
27	Weliyu Jemal	Koka Negewo
28	Sileshi Tadese	Koka Negewo
29	Senbeto Kelo	Koka Negewo
30	Wedajo Shunku	Koka Negewo
31	Sisay Tadese	Koka Negewo
32	Kafani Dayasa	Koka Negewo
33	Tesfaye Dege	Koka Negewo
34	Kayo Tufa	Koka Negewo

Appendix 12 List of interviewed traders and stakeholders

No	Name	Place	Actor
1	Berehanu Haile	Modjo	Wholesaler
2	Seifu Mekonen	Addis Ababa/Atikilt Tera market	Wholesaler
3	Duula Negash	Addis abalba/Atikilt Tera market	Wholesaler
4	Abenet Tesema	Addis ababa/Atikilt Tera market	Wholesaler
5	Fikerte Zeleke	Addis Ababa/Gerji market	Retailer
6	Mulugeta Selemone	Addis Ababa/Kotebe market	Retailer
7	Kebebu Chala	Modjo	Retailer
8	Beshadu Jima	Koka	Retailer
9	Tadese Alemayehu	Modjo	Collector
10	Degu Gemechu	Koka	Collector
	Stakeholders		
No	Organisation	Name of interviewee	Role
1	Irrigation Development Authority	Getu Kasa & Dawit Assegid	Head of IDA & extension team process owner
2	Trade and Market Development Office	Getu Mekonen	Vice head of TMDO
3	Agricultural Transformation Agency	Abenezer Adamu	Project Associate in Agriculture Commercialization & Cluster Team
4	Lume Adama Union	Mesfin Eshete	Marketing research officer

Appendix 13 List of participants on the first and second FGD

The first FGD			
No	Name	Role	Gender
1	Bedada Mojo	Farmer	Male
2	Mojo Birra	Farmer	Male
3	Degaga Telila	Farmer	Male
4	Hirpo Kunbi	Farmer	Male
5	Zenu Bejiga	Farmer	Female
6	Shanbel Assefa	Farmer	Male
7	Abebe Werji	Farmer	Male
8	Bira Bedada	Farmer	Male
9	Kilto Asfaw	Farmer	Male
10	Gashaw Abebe	SMS/expert	Male
11	Teferi Befikadu	Development Agent	Male
The second FGD			
No	Name	Role	Gender
1	Jima Gadisa	Farmer	Male
2	Hirpo Kunbi	Farmer	Male
3	Wosene wodajo	Farmer	Female
4	Balcha Geletu	Elder farmer	Male
5	Beshado Wakayo	Female farmer	Female
6	Zewditu Endiro	Female farmer	Female
7	Abishu Gadisa	Youth	Male
8	Gashaw Abebe	Expert from IDA	Male

Appendix 13 List of participants on the first and second FGD

Appendix 14 Summary of sampled respondents for survey and case study

Stakeholders/actors	Number of respondents			Total	Method of data collection
	Lume Kebeles	Modjo town	Addis Ababa		
Producers	34		-	34	Survey
Collectors		2	-	2	Case study
Wholesalers		1	3	4	Case study
Retailers		2	2	4	Case study
Supermarkets			2	2	Case study
ATA			1	1	Case study
IDA		1	-	1	Case study
TMDO		1	-	1	Case study
Total	34	7	8	49	

Appendix 15 Proposed chain profit share estimation

Channel I Producer linked to consumer cooperatives through producer cooperative per kg

Indicators	Chain Actors			Total
	Producer	Producer coop	Consumer coop	
Cost price	4.2	11	12.3	
Purchase price	0	10.8	12	
Selling price	10.8	12	12.5	
Value added	10.8	1.2	0.5	12.5
Gross margin (%)	86	10	4	100
Profit	6.6	1	0.2	8
Profit share (%)	**85**	**13**	**2**	**100**

Channel II Export channel per kg

Indicators	Chain Actors			Total
	Producer	Producer coop	Exporter	
Cost price	4.2	10.2	14.3	
Purchase price	0	10	11	
Selling price	10	11	15.5	
Value added	10	1	4.5	15.5
Gross margin (%)	65	6	29	100
Profit	5.8	1	1.2	8
Profit share (%)	**74**	**10**	**16**	**100**

Channel III Producer linked to supermarkets through wholesalers per kg

Indicators	Chain Actors			Total
	Producer	Wholesaler	Supermarket	
Cost price	4.2	11	14.3	
Purchase price	0	10	14	
Selling price	10	14	15.5	
Value added	10	4	1.5	15.5
Gross margin (%)	65	26	10	100
Profit	5.8	3	1.2	10
Profit share (%)	**58**	**30**	**12**	**100**

Appendix 16 Pictures with stakeholders