ST.MARRY'S UNIVERSITY SCHOOL OF GRAGUATE STUDIES
DEPARTEMNT OF MARKETING MANAGEMENT

RESEARCH ON

ASSESSMET OF INTEGRATED MILK VALUE CHAIN AND CREDIT SERVICE PARTICIPATION OF MILK PRODUCERS IN ETHIOPIA: THE CASE OF SULULTA AREA DAIRY VALUE CHAIN

By

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JANUARY, 2017
ADDIS ABABA, ETHIOPIA

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ENDORSEMENT

I hereby certify that I have read and evaluated this thesis entitled Assessment of Integrated Milk Value Chain and Credit Service Participation of Milk Producers in Ethiopia: The Case of Sululta Area Dairy Value Chain prepared under my guidance, by Fekadeselassie Wubie. I recommend it to be submitted as fulfilling the thesis requirement.

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STATEMENT OF THE AUTHOR

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LIST OF ACRONYMS AND ABBREVATIONS

CSA	Central Statistical Authority
FAOSTAT	Food and Agricultural Organization of the United Nations Statistics
SNV	Netherlands Development Organization
WOCCU	World Council of Credit Unions
KIT	Royal Tropical Institute
GIZ	Gesellschaftfür Internationale Zusammenarbeit
MFIs	Microfinance Institute
USAID	United States Agency for International Development
HSF	Hanns Seidel Foundation/Germany
NCAF	Ninoy and Cory Aquino Foundation
ILRI	International Livestock Research Institute
INCLUDE	Inclusive Development of the Economy
NBCCU	Nepal Bee-keepers Central Cooperative Union
FNBK	Federation of Nepalese Bee-keepers of Nepal
FENACREP	Peru's National Credit Union Federation
DDC	Dairy Development Corporation
BJCS	Bukonzo Joint Cooperative Society
NACF	National Agricultural Cooperative Federation
FAO	Food and Agriculture Organization
EIAR	Ethiopian Institute of Agricultural Research,
SDAO	Sululta District Agricultural Office

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ABSTRACT

Identifying the main value chain actors and supply of credit services have been seen to have a significant effect on value chain adding activities of milk producers. Rural households' participation in formal credit service is limited. This study assessed the structure, conduct and performance of milk market, factors influencing milk producers' participation in formal credit markets and level of credit used to milk production and marketing. The study also assessed the milk value chain; to estimate the gross marketing margin, flow of the product, information among the major chain actors. This study employed stratified random sampling method and 120 household were selected from the six kebeles of the district. An interviewed was also conducted with 10 cooperatives, 2 milk processing industries, 2 financial institutions and 2 NGOs. The major actors participated in the milk value chain were producers, wholesalers, cooperatives, retailers, processors and consumers with the higher producers marketing margin of 61.3% for the channel that passes through cooperatives. The participation decision of the households in credit market and factors determining the level of credit utilization in milk production and marketing is analyzed using double hurdle model. The first stage result of double hurdle model reveals that education level, family size. Social role, land size, and distance to formal lending institution have significantly affected the credit p+articipation decision of the households. The second stage result shows that age, income crop, number of cows, and year of experience influence the level of credit utilized in milk production and marketing. Therefore, minimizing the barriers of access to credit use through nearby supply of the institutions and providing extension services regarding to the use of credit providing institutions need to be taken in to consideration to attract small scale producers to participate in formal credit market and to utilize it in milk production.

Key words*: value chain, actors, credit, marketing margin, double-hurdle*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Ethiopia has a huge potential to be one of the key countries in dairy production for various reasons (Pratt et al., 2008). These include a large population of milk cows in the country estimated at 9.9 million (CSA, 2008), a conducive and relatively disease free agro-ecology, particularly the mixed crop–livestock systems in the highlands that can support crossbred and pure dairy breeds of cows , huge potential for production of high quality feeds under rain fed and irrigated conditions, existence of a relatively large human population with a long tradition of consumption of milk and milk products and hence a potentially large domestic market (Holloway et al., 2000).

According to FAOSTAT (2007), among the 20 major food and agricultural commodities ranked by value in 2005, whole fresh cow milk is ranked third. Milk production in the same year was estimated at 1.5 million tones which is equivalent to USD 398.9 million. Dairy production, among the sector of livestock production systems, is a critical issue in Ethiopia where livestock and its products are important sources of food and income, and dairying has not been fully exploited and promoted in the country (FAOSTAT, 2007).

A number of fundamental constraints, including backward way of production, limited supply of inputs (feed, breeding stock, artificial insemination and water), poor or non-existent extension service, high disease prevalence, poor marketing infrastructure, lack of marketing support services and market information, limited credit services, absence of effective producers 'organizations at the grass roots levels, and natural resources degradation (Berhanu et al.,2006). In addition, policy decision on milk and milk product marketing are taken in the absence of vital information on how they affect dairy producers, traders, exporters, and consumers. Similarly, current knowledge on dairy product market structure, performance and prices is poor for designing policies and institutions to overcome the perceived problems in the marketing system (Ayele et al., 2003).

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Dairy products in Ethiopia are channeled to consumers through formal and informal marketing systems (Tsehay, 2001). The formal marketing system appeared to be expanding during the last decade with private farms entering the dairy processing. The informal market directly delivers dairy products by producers to consumer (immediate neighborhood or sales to itinerant traders or individuals in nearby towns). In Ethiopia, the share of milk sold in formal market is less than 2% compared to 15% in Kenya and 5% in Uganda (Muriuki and Thorpe, 2001). As an option, dairy farmers processed 93% of milk produced into milk products. Generally, the low marketability of milk and milk products pose limitations on possibilities of exploring distant but rewarding markets. Therefore, improving position of dairy farmers to actively engage in markets and improve traditional processing techniques are important dairy value chain challenges of the country (Holloway et al., 2002).

The value chain analysis in particular focuses on understanding factors that determine market success, and how that information is transmitted between actors in the value chain to provide market or price incentive to supply the market and invest in meeting standards, improving quality and expanding productivity. In a profitable market with growing volumes, there should be an opportunity for deepening the value chain through new specialized service providers (e.g. collectors and transporters, operators of collection centers, providers of artificial insemination and veterinary services, auctions, feed producers, feedlots, and much more). There should also be an incentive for increased vertical integration, and delivering embedded services provided by lead firms to actors in their value chains(Tracey et al., 1999).

Value chain has been promoted by different development organizations and Ethiopian Government with the objective of enhancing the livelihood of rural community and urban and peri-urban entrepreneurs. In some parts of the country, farmers were challenged with price decline for their produce as their supply increases beyond the market size of their village or nearby small town. Market access is becoming major problems ahead of issues of productivity. That is why value chain concept becoming famous and get the attention of development organizations and governments, with the objective of addressing the market linkage problem of the rural community (SNV Annual Report 2009, Page 17, 20, 31).

Value chain development is not however an easy task. It is mired by various deep rooted challenges. Among these challenges financing is at the forefront. Access to adequate and timely financial services for all actors in the chain is essential. Like the large producers and traders small producers and traders need finance for efficient performance in their respective spot within the value chain. But, such finances are not always available to mainly to those working in agricultural and rural value chain. Value chain development is hindered by various deep rooted challenges. Among these challenges financing is at the forefront. Regular banks operation is limited in rural finance as it is perceived as risky and costly. Microfinance Institutions are also inaccessible because of their low level of function single borrower limit, limited coverage, and high interest rate. Risks related to agriculture such as crop failure, diseases and market fluctuations coupled with limited availability of insurance products and absence of strong collateral makes such segments unattractive to these banks (WOCCU 2009).

Hence, this research is undertaken to assess an integrated value chain financing in the case of Milk value Chain Financing at Sululta Area in order to investigate the problems in the respective stakeholders and find the possible solutions for these problems to benefit all the stakeholders and for the overall improvement of Milk productivity and overall production with efficient integration of the stakeholders to satisfy the national demand for milk and dairy products. The research selected Suluta area from the perspectives of its potential for milk production and nearness to the main market of Addis Ababa.

1.2 Statement of the Problem

Dairying is a means of providing an additional source of income and employment to small and marginal producers in the country. The smallholders produce about 98 percent of the total milk production in Ethiopia (SNV, 2008), but it is only small quantity of this production that is marketed in the form of liquid milk; the larger volume is processed into different dairy products for home consumption and sales. In Ethiopia, the traditional processing and trade of dairy products, especially traditional soured butter, dominate the dairy sector. Of the total milk produced, only five percent is marketed as liquid milk due to under development of infrastructure in rural areas

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(Mohamed et al., 2004). A similar study conducted by Berhanu(2012) revealed that out of the milk produced per year in rural Ethiopia, 6.55 percent was sold in the market, 48.48 percent was home consumed, 0.41 percent was used for wages in kind and 44.56 percent was processed into butter and cottage cheese.

Lot of efforts is currently underway in linking the rural community to market with the objective of enhancing the livelihood of the rural community and of the growth of the overall economy. Value chain concept is at the forefront in these efforts. Establishment of market and collection for different product markets, provision of training on business, product quality, value chain governance, provision of seed money and technical assistance to different actors in selected value chains are among the type of efforts made (Target 2008). Remarkable achievements are declared by promoters and actors in the value chain because of such interventions (SNV 2009). However, sustainability and efficiency of value chains are challenged by a serious finance gap (KIT 2010).

The approach of *value chain financing* which is the solution for the Milk production is a *new concept in Ethiopia* and its sustainability and efficiency are challenged by a serious finance gap (KIT 2010). Consequently, value chain financing for agribusiness still has very limited converge. The problem of finance gap is significant to a country like Ethiopia where agriculture constitutes about 43.2% of the economy and a source of living for about 84% of the population (CSA 2009).

A number of researches were conducted on milk value chain such as, dairy marketing chains analysis the case of Shashemene, Hawassa and Bale districts by Woldemichael(2008); market access and value chain analysis of dairy industry in Ethiopia the case of Wolaita zone by Berhanu (2012); value chain and quality of milk in Sululta and Welmera weredas by Mustefa (2012); value chain financing the case of Selale area by Getenet (2010) which were reviewed by this researcher. These studies did not address the integrated role of actors for milk value chain financing in the selected area of Sululta. Therefore, this research aimed at to fill the research gap as indicated in the objective of the research paper is to analyze the integrated value chain financing by identifying the factors affecting the role of the actors in the case of Sululta area.

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1.3 Research Questions

This study is expected to answer the following basic research questions:

❖ Who are the actors participating in the milk value chain their important roles in the integrated milk value chain financing in the study area?

❖ What looks like the structure, conduct and performance of milk market in the study area?

❖ What are the factors affecting the integrated milk value chain financing?

1.4 Objective of the Study

1.4.1 General Objective

The general objective of the study is to analyze the Integrated Milk Value Chain Credit Service in Sululta area.

1.4.2 Specific Objectives

❖ To identify the major value chain actors and their role in milk value chain in the study area.

❖ To analyze structure, conduct and performance of milk market in the study area.

❖ To identify factors affecting participation of milk producers for credit services and level of credit utilized in milk production and marketing from the loan

1.5 Significance of the Study

This study was provided useful information to develop integrated milk value chain financing in Sululta area. The users of the study findings includes: Farmers, Cooperatives, Financial Institutions, Milk processing industries, and Traders.

❖ The research is expected to give insight to the cooperatives and farmers to address how their financing gap will be solved through value chain initiatives.

❖ The research will give more information to financial institutions how they could benefit from the potential market by proper mitigation of risks and lowering of running costs.

❖ The research also identifies the relationship of the milk processing industries interventions for efficiency value chain financing.

Other researcher will benefit from this study to use it as a reference to undertake similar studies and will serve as filling some of the gaps in this research.

1.6 Scope and Limitation of the Study

1.6.1 Scope of the Study

The research was conducted in Sululta area milk value chain which is selected for the large number of actors' involvement, especially at the level of producers and traders. In addition, this area is selected based on convenience and involvement of the rural and peri-urban community.

The study is limited to milk value chain financing from the vast subject of value chain and also in a specific area of Sululta. The sample size from each actors are limited to 120 farmers, 10 cooperatives, 2 financial institutions, 2 milk processing industries and 2 NGOs.

1.6.2 Limitation of the Study

The value chain analysis was carried out based on questionnaires that include socio-economic and institutional issues to get information pertinent to the research. The questionnaires were targeted major actors of the chain that obtained from the target population in the study area. But regarding to the determinants of credit market participation, this study did not consider the issue of credit providing institution rather it only focused on household issues which affects decision of the household. This is because of resource and time limitation.

1.7 Organization of the Study

The thesis is organized into 5 chapters. In chapter 1, introduction of the study which includes background of the study, statement of the problem, objective of the study, research questions, significance of the study, scope and limitation. In chapter 2, review of theoretical and empirical works related to the study will be presented. Chapter 3 discusses the research methodology used in the study. Results and discussions are presented in chapter 4. Chapter 5 summarizes the findings of the study and presents implications for milk value chain financing stakeholders.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Literature Reviews

2.1.1 Basic Concepts and Definitions

Value Chains - It is the full range of activities which are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use. It is the sequence of activities required to make a product or provide a service. A value chain is characterized by a market-focused collaboration of a set of enterprises working together to produce, process and market products and services in an effective and efficient manner. Value Chains allow businesses to respond to the marketplace by linking production, processing and marketing activities to market demands (Vermeulenet al., 2008).

The term value chain is used by Michael Porter in his book entitled: Competitive Advantage published in 1985. Porter introduced a generic value chain model that comprises a sequence of activities. He classified them as primary activities and support activities. The goal of these activities is to offer the customers a level of value that exceeds the cost of the activities, thereby resulting in a profit margin. Primary activities include inbound logistic, operations, outbound logistics, marketing and sales and services. The primary activities are supported by infrastructures of the firm, human resource management, technology development and procurement.

Various practitioners defined and formulated different approaches for value chain development. Kaplinsky and Mike Morris in their book entitled: Hand Book of Value Chain Research (2001, page 8) describes value chain from development perspective as: the full range of activities which are required to bring a product or service from conception, through the different phases of

production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use.

The value link manual of GTZ (Development organization of Germany) defined value chain as a sequence of related business activities (functions) from the provision of specific inputs for a particular product to primary production, transformation, marketing, and up to the final sale of the particular product to consumers (the functional view on a value chain). This particular definition is related to Porter's definition of value chain as it is related to a specific business perspective. The same manual, defined value chain as an alternate definition as the set of enterprises (operators) performing these functions i.e. producers, processors, traders and distributors of a particular product. Enterprises are linked by a series of business transactions in which the product is passed on from primary producers to end consumers. According to the sequence of functions and operators, value chains consist of a series of chain links (or stages) (GTZ 2007, page 11).

Chain Actors - are those involved in producing, processing, trading or consuming a particular product (IIRR et al., 2006). They include direct actors which are commercially involved in the chain (producers, traders, retailers, consumers) and indirect actors which provide financial or non-financial support services, such as bankers and credit agencies, business service providers, government, researchers and extension people. In terms of chain actors, value chain may be explained as a specific type of supply chain, where by the actors actively seek to support each other so that they can increase their efficiency and competitiveness. A study by UNDP/BCS/TetraPak (2006) on analysis of value chain for milk in Tanzania identified main actors in the chain to be farmers, milk collection centers, dairy processors, milk distributors and retailers and consumers. However, the study did no
t explicitly describe how* these value chain actors are linked to each other and how their organization and coordination would influence the dairy sub sector development.

Value Addition - It is increasing the time, place, information or form utility, and monetary worth of a product at each link of the chain. It describes what value the actors add to the product

to higher the customer value offered from the product. Value addition can be altering of a product; it can be the adoption of new production or handling methods that increase a farmer's capacity and reliability in meeting market demand. Value addition has a particular importance for the farmers in that it brings bargaining power and allows them to create new markets or differentiate a product from others and thus gain advantage over competitors (Biruk, 2015).

Value Chain Map - It is a visual representation of the relationship of actors in a value chain as well as other market players through a simple diagram (Biruk, 2015).

Value Chain Analysis – assessment of the actors and factors influencing the performance of an industry, and relationships among participants to identify the main constraints to increased efficiency, productivity and competitiveness of an industry and how these constraints can be overcome (Fries, 2007).

According to Kaplinsky and Morris, value chain analysis resolves the weaknesses of the traditional sector analysis, which doesn't look into the inter linkage between interrelated actors in a given market chain (Kaplinsky and Morris 2001, page 6).

Value chain guide of the World Bank explains how value chain analysis differs from the traditional sector analysis:

❖ Identifying dynamic linkages between productive activities, value chain analysis transcends traditional economic and industry sectors by showing where value is added in production process.

❖ Value chain analysis focuses on net value added instead of overall size and gross output.

❖ Traditional industry sector analyses often do not sufficiently determine the distribution of value added between activities, both within and between countries, or a country's current insertion in local markets.

❖ Value chain analysis thoroughly examines information flows among actors in the value chain unlike typical industry analysis.

❖ Segmenting the value chain allows for better understanding of the constraints and opportunities within each segment, as well as the context in which the chain operates (World Bank 2007, page 21).

Analyzing and Evaluating Value Chains

Value chain analysis focuses on segmenting the different activities that add value in the production and sale of a product or service. It differs from traditional industry sector analyses in many ways, including the following:

❖ Identifying dynamic linkages between productive activities, value chain analysis transcends traditional economic and industry sectors by showing where value is added in a production process.

❖ Value chain analysis focuses on net value added instead of overall size and gross output.

❖ Traditional industry sector analyses often do not sufficiently determine the distribution of value added between activities, both within and between countries, or a country's current insertion in local markets.

❖ Value chain analysis thoroughly examines information flows among actors in the value chain unlike typical industry analysis.

❖ Segmenting the value chain allows for better understanding of the constraints and opportunities within each segment, as well as the context in which the chain operates.

There are many ways to analyze or evaluate a value chain. Analysis can stem from research of secondary information, such as government or industry data, to interviews with industry participants. It can also be derived from participatory market assessments and market observations. Once the information is gathered, numerous tools and processes help interpret and inform the resulting analysis.

In general, an in-depth value chain analysis considers the following:

❖ What are the economic costs along the value chain?

❖ Where is the most value added to the value chain?

❖ Who are the most import actors within the value chain?

❖ What is the institutional framework of the value chain?

- ❖ Where are the bottlenecks in the value chain?
- ❖ Where is there market potential for growth?
- ❖ What is the size of the sector/chain?
- ❖ What is the potential for upgrading?
- ❖ What possible synergies exist?

Some development organizations developed their own version of value chain. These include different methodologies to map the physical flow of commodities along the chain, output values at different stages of value chains, export market potentials, the regional spread of value chains, inter-firm cooperation, production efficiency, etc. For instance GTZ has a concept called Value Links. In its present state, it embraces the generic methodology of value chain promotion. Its application in different industries and in countries with varying degrees of economic development calls for additional situation specific tools. Of particular interest is its application to business opportunities at the bottom of the pyramid. It is planned to produce sector-specific as well as country-specific versions of Value Links that address specific needs. USAID developed its Participatory Value Chain Analysis and it recommended quite extensive studies-based procedures for the design of value chain programs like that of GTZ. Various organizations have commissioned various value chain analyses to identify their entry point for intervention in chain development (Altenburg 2007, page 33).

2.1.2 Basic Concept and Definition of Value Chain Finance

Value Chain Finance - financial services and products flowing to and/or through value chain participants to address and alleviate driving constraints to growth (Fries, 2007). Value chain finance is then linking of financial institutions to the value chain, offering financial services to support the product flow, and building on the established relationships in the chain. It means that the product flow in the value chain is used as a carrier to provide financial services. This way of financing can spread risk among the financial institutions and chain actors and provides alternatives to traditional collateral requirements (KIT 2010).

Value Chain Finance brought new business opportunities for the financial institutions. According to Milder, to benefit from this opportunity, there is a need to change thinking change

and amendments to some regulatory frameworks (Enterprise Development and Microfinance. 2008, page 1) According to KIT (KIT 2007, page 20), Value Chain financing consist of short-term loans to ensure a smooth flow of products, keep the chain running and maintain long-term relationships between trusted business partners. They may be given in cash or in kind. Agricultural finance refers financial services from commercial banks, microfinance institutions and other financial institutions.

Value Chain Finance - means "linking financial institutions to the value chain, offering financial services to support the product flow, and building on the established relationships in the chain". They further elaborated that the product flow in the value chain is used as a carrier to provide financial services and way of financing can spread risk among the financial institutions and chain actors and provides alternatives to traditional collateral requirements. It provides tremendous potential for unleashing capital, scaling up and sustaining chain prospects, but it needs to be managed and organized well (IIRR) (KIT 2010, page 13).

World Council of Credit Unions (WOCCU) claim that successful value chain financing when administered by credit unions are need to have solid financial institutions, organized producer groups with market potential, basic infrastructure (roads, electricity and telephone), legal systems that enforce contracts, end buyers who are willing to participate in the value chain, staff members, technical assistance providers and market data (WOCCU 2009, P.11).

WOCCU identifies three value chain financing phases namely: Phase 1: Identify, evaluate, and prioritize value chains, Phase 2: Facilitate and leverage market linkages and Phase 3: Tailor, underwrite, and administer the loans (WOCCU 2009, page 3). WOCCU proposes more roles to the financing institution, mainly in researching, coordinating and managing the whole process. Whereas based on experiences of Royal Tropical Institute and IIRR, leading role or initiation for the value chain financing could come from actors in the value chain. Both parties agree the presence of strong trust and relationships between the value chain actors and the financial institutions.

A concept paper prepared by USAID on value chain financing presents a conceptual guide for looking at financial flows, informally known as the "4-A Framework." The framework is intended to look financing from four angles, which are the enterprise, the entrepreneur, the financial product and the financial provider. The purpose is to group issues in four key questions. The key questions are (4As):"Is the activity "bankable"? Does the value chain actor have the needed knowhow or "Acumen" to get optimal return from this financing? Is the financing needed "Accessible" to the user? And, finally, is the financing "Available"?"(USAID 2007a, page 13).

2.1.3 Value Chain Financing Business Model

As per *Microfinance Summit Nepal 2010 "Microfinance for Inclusive Economic Growth" by GTZ*, value chain financing business model is presented below:

Although agricultural value chain finance deals with a range of agribusinesses and other chain partners who are both large and small, value chain finance is particularly useful in helping link small farmers and agribusinesses into effective market systems. With models that promote economies of scale and reduce risks for lenders and buyers, smallholder farmers are more viable contributors to modern agricultural systems. Because smallholder production is important in many value chains for both economic and social considerations, special emphasis must be given to models which allow them to fully participate in value chains.

2.1.3.1 Business Models for Value Chain Finance through Cooperatives

There are various financial products and services that have been developed to finance value chains. In general they are categorized into those provided by value chain actors themselves (internal or direct financing) and those provided by external financial institutions (external or indirect financing).

In the following various types of value chain finance are presented as they can be provided by cooperatives. This type of organization is expected to be very appropriate for value chain development:

- Cooperatives combine at least two stages of a value chain within their organization (e.g. production at member level and processing, marketing at cooperative level).
- The dual identity of members as owners of the cooperative and as the users of its services (suppliers) increases trust and reduces overall operations cost.
- Cooperatives have experience with transparent decision making processes, with balancing of interests and with attribution of benefits and therefore can contribute to the governance of the value chain.
- Cooperatives are deeply rooted into their environment and by principle bound to contribute to social and economic development in their area of operation.

Direct or Internal Financing by Cooperatives Within the Value Chain

A very common type of finance for value chain actors is internal financing from within the value chain, especially direct financing between the interlinked actors of the value chain (i.e. cooperatives and other types of suppliers, traders, input suppliers).

There are various types of "direct" value-chain financing involving cooperatives:

- A marketing cooperative for Milk advances credit to small-scale farmers;
- A supply cooperative provides inputs (seeds) on credit to members and accepts payment after harvest time;
- A producer cooperative extends technical assistance to its members against nominal fees to be paid after harvest.

From their very nature supply and marketing cooperatives are able to link various stages of value creation (e.g. production, processing, and distribution). They have the potential to become highly effective value chain actors for particular commodities like coffee, dairy, honey. The required funds may be obtained from retained surplus in the commodity business of the cooperative. In this case no financial institution is involved, but the volume and term of loans will be very limited.

Alternatively, the cooperative may take a long-tem loan in order to provide trader credit to its members. In this case the cooperative takes the risk of long-term financing of small-scale producers. However, the risk is limited since the cooperative has insights into the business performance and creditworthiness of its own members. Through trader credit the cooperative guarantees a steady supply of raw material to keep its own business running.

The direct financial flows between value chain actors (trader credit) often take the form of "in-kind" transfers in both ways. The lender advances inputs such as seed for payment at a later date. Frequently the borrower provides the repayment in kind as well, i.e. in the form of produce. In such cases no cash changes hands and no financial institutions like financial service cooperatives are required.

Indirect or External Value Chain from Financial-Service Cooperatives

Indirect value chain finance is provided by external financial institutions, including financial service cooperatives (Credit Unions, CU). In principle, they can provide many types of financial services to value chain actors:

❖ Short and longer-term loans for working capital or investment purposes.
❖ Leasing of equipment for processing, storage, transport etc.
❖ Insurance in order to mitigate risks of production or storage.

Financial service cooperatives comprise savings and credit cooperatives, credit unions, and multipurpose cooperatives. Their operations are often centered on a particular locality or region. Loans are extended by the cooperative to its members, some of which are actors in value chains. The loan portfolio may be raised from savings of members or from a wholesale loan from a third party.

The cooperative has the advantage of being able to assess the creditworthiness of its members very well. This demands to evaluate the position and perspectives of the member as a value chain actor. Creditworthiness is supported by the existing interdependence and long-term business

relationship between producers (farmers) and processor or buyer. Creditworthiness is constrained in case of a low importance of delivery from the member to the processor (e.g. in mass markets like dairy) and if the production process is easy to duplicate (mass products like crops, rice). The legal environment also needs to inspire trust and reduce risk for the financial cooperative.

The indirect financial products are embedded into the relationship between a financial institution on one side and producers, processors, traders as its clients on the other side. In many cases the financial service provider does not take into account whether the client is an actor of a value chain or not. There is a tendency that the opportunities which the value chain provides for the client are not reflected in the credit transaction. Consequently, potential benefits for the financial service provider (less risk) and for the borrower (lower interest rate) are not utilized.

Cooperatives as Intermediary Between Financial Institutions and Groups of (Small-Scale) Producers

As a first possible approach marketing cooperatives may assist their members in accessing loans, which otherwise have little access to financial institutions. As a second approach financial service cooperatives may assist in piloting innovative approaches of value chain financing. Here the credit cooperatives utilize their high level of information on their members with regard to value chain linkages, business performance as well as credit history.

However, in general the resources of a credit cooperative are rather limited, which restricts lending activities to only few actors in the value chain. The demand for credit from the other actors, including members of the cooperatives may still be unmet. It will also be impossible for a single financial cooperative to provide cascade financing, i.e. to finance the entire value chain by itself. In order to achieve a major contribution to the financing of a particular value chain, financial cooperatives need to collaborate with third parties. These may be other credit cooperatives which are linked in a regional interblending pool. Alternatively credit cooperatives may obtain a whole sale loan from a bank of from a development fund and provide on lending to their members.

Combining Direct and Indirect Value Chain Financing Through Cooperatives (Contract Farming, Warehouse Receipt Scheme)

Both direct and indirect value chain financing are constrained by the disadvantages spelt out above. This leads to the questions, on whether by combing aspects of direct and indirect value chain financing through cooperatives the constraints may be overcome and new opportunities may be taken advantage of.

First of all, the mere existence of linkages between the actors of a value chain should support indirect financial flows as they make the potential client more attractive to external financial institutions. When a marketing cooperative with a strong reputation as a reliable processor or buyer is willing to "vouch" for its members as efficient producers, even small-scale farmers become more attractive clients to financial institutions.

The real challenge lies in creating more and stronger bridges between the value chain and financial service cooperatives by combining models of direct and indirect value-chain finance. In the following we examine two common types of value chain financing which combine elements of direct and indirect financing in order to assess their potentials and limitations:

❖ **Contract Farming -** an agricultural supply and marketing cooperative advances finance inputs and technical assistance to its members as contracted farmers, which is(partly) supported by credit from a financial institution;

❖ **Warehouse Receipt System -** a financial-service cooperative provides credit to farmers on the basis of warehouse receipts, which are issued by a marketing cooperative to depositors of non-perishable commodities.

2.1.4 Opportunities in Combining Direct and Indirect Value-Chain Finance for Financial Institutions

Linking financial-service cooperatives to the value chain can be an effective way of transforming direct financing into a viable, long-term financing relationship. The following considerations allow determining opportunities and constraints for financial institutions.

❖ Fast growing value chains are generally capital deficient, do not have excess capital to lend, and have no competitive advantage in lending to small-scale producers. This creates chances for external financial institutions.

❖ The linkages between actors inside the value chain have a positive effect on their dealings with financial institutions. The established relationships facilitate credit screening, monitoring and enforcement and result in faster credit provision.

❖ The access to external credit complements the strength of value-chain relationships and provides more opportunities for financial flows between the actors within the value chain.

❖ Secure markets and improved skills through participation in the value chain make potential borrowers more creditworthy to financial institutions.

❖ The combination of direct and indirect value chain finance allows the processor to focus on commercial transactions and on non-financial services (marketing, inputs, technical assistance etc.) while the financial institution concentrates on the credit service itself.

❖ Through involvement of financial institutions more sustainability may be achieved, as it taps into a large potential pool of funds and transfers responsibility for the actual lending to a specialized entity with lending as its core business.

❖ Because of the involvement of regulated financial institutions, clients may have access to a greater range of services, including savings, leasing, transfers, credit, and insurance.

❖ For financial institutions it is important to estimate how external finance is perceived by the value chain actors with respect to extending or accessing trade credit and how the outside capital injected into the chain will influence existing financial flows.

❖ A situation must be avoided by which external financing replaces existing financial flows within the chain and small-scale farmers lose access to non-financial and financial services which they already had.

There are many opportunities, which may be exploited by financial institutions in value chain financing. Value chains are a growing market for financial products, they are important for regional development, and they allow financial institutions entering new market niches. They demand a clear sense of the chances and risks involved in lending to the value chain.

As regards their structures and incentives for lending to value chains financial institutions can be broadly grouped in the following institutional categories:

❖ Banks have shown an interest to provide credit to key players in value chains but are not cost efficient in lending to small-scale producers.

❖ Agricultural finance companies tend to specialize in financing high value crops which are of less relevance for small-scale farmers.

❖ Microfinance institutions may offer small farmers standard individual or group loans but have limited expertise in agriculture.

❖ Savings and credit cooperatives can also offer savings products, but are limited in their ability to develop payment schemes around agricultural cash flows (loans are tied to the amount of savings held by the borrower).

2.2 Methodological Framework

Value chain analysis has different dimensions of studies. It involves an assessment of the relationships between the different stakeholders which, coupled with the effective flow of information, enables the economic and environmental optimization of material flows, allocating time, people and technology appropriately and with minimal impacts on the environment. The value chain analysis methodology focuses on three key issues: The dynamics of information in the value chain from final consumption through to primary production and input suppliers, the creation and flow of value at each stage in the eyes of the final consumer, and the nature of relationships among the actors. Value chain analysis model integrates analysis of commodity supply chain and associated enabling environment with entry point of product and process flow, information and money flow, and the enabling environment (Webber, 2009).

According to Berg et al. (2006) the value chain approaches apply six tools and steps. The analysis starts with prioritizing a commodity for value chain development and then mapping of the value chain; analysis of the value chain performance in terms of costs-, prices and margins; analysis of technology, knowledge and upgrading possibilities through assessment of gaps in technology and knowledge and existing or future opportunities; value chain governance which is used to identify stakeholders influencing governance, rules and regulations and their enforcement and finally linkages and relationships among the stakeholders analyzed.

Value chain can be analyzed through mapping value chain which describes the full set of activities required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation, and the input of various producer services), and delivery to final consumers (Kaplinsky and Morris, 2001).

Value chain mapping helps to illustrate and understand the process by which a product goes through several stages until it reaches the final customer (i.e. the core transactions). And understanding about the different levels in a value chain is also a precondition for identifying bottlenecks that are preventing the achievement of certain targets. Value chain maps can explore market opportunities and it also shows up different market channels through which products and services reach the final customer. These maps can also provide additional information on the relevance of individual market channels and the nature of relationships (e.g. number of competitors, size of market, number of workers, value chain governance, etc.).

A value chain map can serve as a way of identifying and categorizing key market players. Such value chain maps may help to invite market players to various workshops and trainings to improve the efficiency of the chain and quality of the product. Value chain maps can also illustrate which other supporting organizations (government, NGOs, associations, etc.) are available, and which value chain levels they concentrate their services on.

However value chain analyses have provided a number of important insights, it has a number of limitation. Webber (2009), observed as value chain analysis too often focuses simply on improvements within the given value chain, rather than on how value chains can be shifted to

target different, more attractive markets and business strategies and also it lacks the ability to analyze specific, chain-level upgrading strategies and assessment of their impacts. More specifically, objective assessment and ranking of impacts of upgrading strategies and optimal entry points for intervention are lacking.

According to Raikes *et al.* (2000), value chain analysis lacks quantitative analysis or methods embedded in the approach. It mainly focuses in the analysis of profitability and margins within the chain whose measurement of profits within the chain is problematic and confined to abstraction rather than quantification. Lalonde and Pohlen (1996) observed that available performance measures do not cross boundaries between functions in the chain, and are not focused on individual products or relationships. Qualitative approaches recognize that value chain and their relationships are dynamic. Value chains are not fixed in terms of composition, relationships, or market positioning, and that there is a competitive need to alter and improve the value chain in light of strategic choices that businesses can make regarding the markets in which they compete. While a value chain's purpose is to link production to the target market advantageously, it is the private sector that decides which markets and where to compete and alters the value chain accordingly. So it is better to consider its variability. But, less attention has been paid to the potential unintended consequences of interventions or changes to one part of the value chain over time (Lee *et al.*, 1997). Therefore, considering its dynamics is very important for policy intervention.

Still another important drawback is that value chain analysis is resource (finance and time) demanding to generate baseline information to identify and prioritize chain constraints and come up with upgrading strategies. This is because it deploys both participatory and analytical tools to concretize policy based interventions.

2.3 Empirical Literature Reviews

"Inclusive Development of the Economy (INCLUDE)" GTZ in Nepal 2010 presentation provides an overview on various types of value chain finance with specific reference on the role of cooperatives in providing financing for value chain actors.

2.3.1 Examples of Value Chain Financing Through Cooperatives

Supply and marketing cooperatives as provider of direct value chain finance: Dos Pinos Dairy Cooperative in Costa Rica

The dairy cooperative has 1,300 members most of which are small farmers (61 %deliver up to 500 liter of milk per day). It provides farmers with everything they need to produce, including animal feed and equipment. Much of the required funds are supplied by the members and by the workers through their savings. The cooperative rarely seeks resources from financial markets. The cooperative has two direct financing services: a credit card service and farmer loans.

Through the credit card service members purchase inputs in the cooperative's farm and veterinary stores. This ensures an efficient service, greater control, and lower transactions costs. Members can also use the card to shop in other stores for items which are not available at the cooperative's own stores. The card scheme has these main conditions:

❖ The card covers a revolving line of credit up to each producer's payment capacity: 22.5% of subscribed and paid-in capital for purchases within the cooperative and2.5% for purchases outside.
❖ Financing plans for purchases from outside sources with timetables and annual interest rates according to client preferences: from one week (0%) to 99 weeks (24%)
❖ Automatic loan repayments are deducted from settlement of milk payments.

Farmer Loan Program finances working capital and infrastructure investments, such as storage facilities, equipment and chilling tanks. It is offered with payment schedules ranging from two to five years. The loan scheme has these main conditions:

❖ Maximum loan amount depends on the credit record.
❖ Term for working capital loans up to two years for purchase of inputs and supplies.
❖ Term for investment loan up to five years for purchase of animals.
❖ All equipment is to be purchased from the cooperative.

Central cooperatives as provider of direct value chain finance: Kathmandu District Cooperative Union in Nepal

Bee keeping is an important agricultural sub-sector in many districts of the Terai and hillside regions of Nepal. Thousands of persons, many of them belonging to disadvantaged groups, utilize the freely available natural resources through keeping of bees. In the past milk was sold at local markets in an unprocessed state.

Most of the bee-keepers are members of local bee-keeper cooperatives, which provide assistance and equipment and also market part of the production. The cooperatives at primary level have affiliated to the Nepal Bee-keepers Central Cooperative Union (NBCCU), which is based in Chitwan district. Besides, most of the bee-keepers are also members of the Federation of Nepalese Bee-keepers of Nepal (FNBK). While the latter is offering technical assistance and represents the interests of its members, the NBCCU is in charge of collecting, processing, packaging, quality control and marketing of the honey.

Financial service cooperatives as provider of indirect value chain finance: WOCCU's phase model for integrated value chain finance in Peru

In partnership with Peru's National Credit Union Federation and with funding from USAID WOCCU supports six credit unions in Peru to develop an integrated model of value chain finance for local producer groups in several value chains (cacao, coffee, dairy, guinea pigs etc.). In the period October 2007 to December 2008 over 1,000 loans were disbursed at a total value of 1.6 million USD and with about 3,700 beneficiaries, experiencing a delinquency rate of 2.65%.

To this end WOCCU and its partners developed a four-phase value chain finance methodology, which helps to assess and mitigate the specific risks associated with value chain financing and to design products which meet the various financing needs along the value chain.

The following graph presents the activities of Credit Unions (CUs), which have to be undertaken for financing can be provided for the various actors along the value chain. It is a precondition

that the CUs have been capacitated for the evaluation of opportunities and risks, for supporting of market linkages, for designing products, and for loan administration. In addition the CUs open their membership to all types of value chain actors and employ loan officers with agricultural expertise.

Fig 2.1. Credit Unions (CUs), Undertaken for Financing
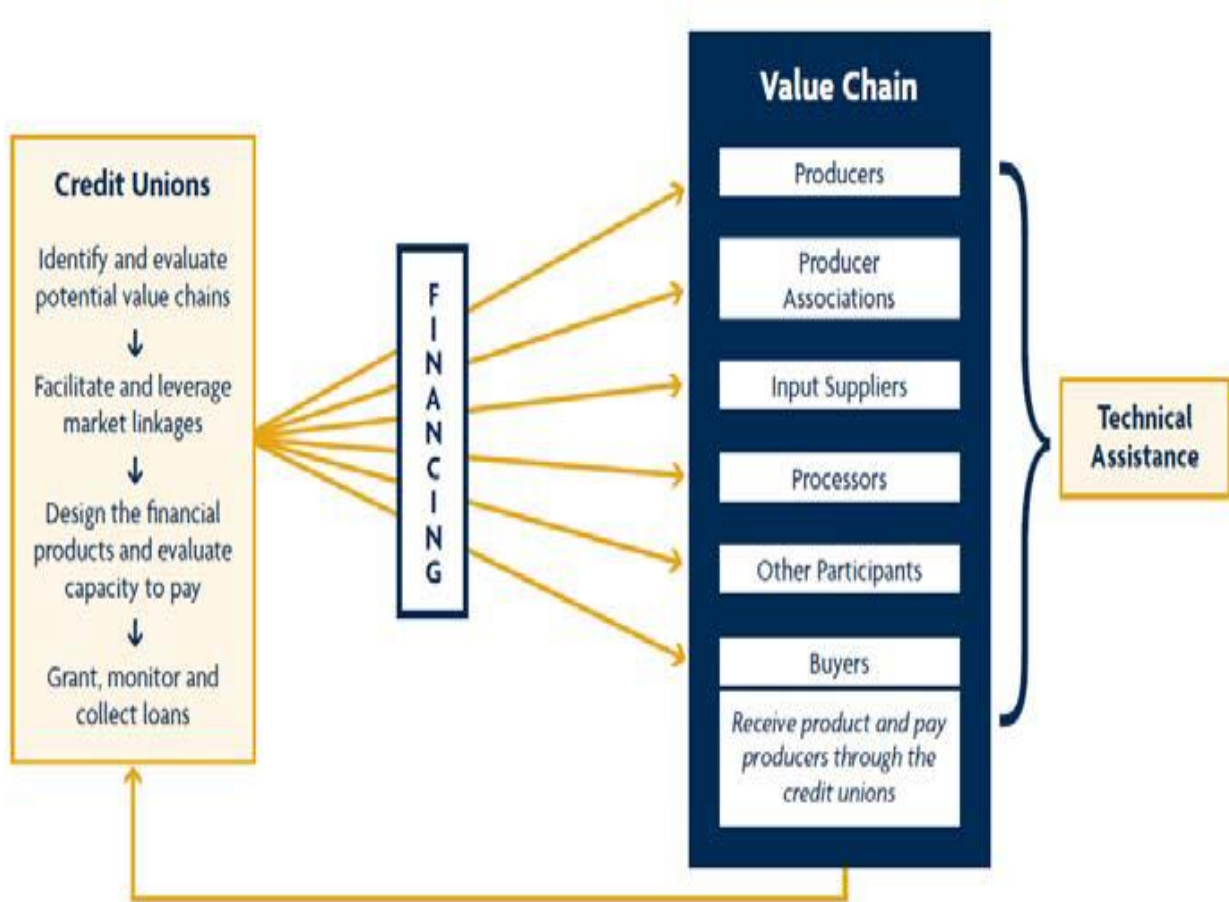
Source: WOCCU, 2009

Marketing cooperatives as intermediary between financial institution and small-scale producers: Siddhi Milk Producer Cooperative in Rupandehi District, Nepal

One of the most important agricultural sub-sectors in Nepal is the dairy sector, which is of greatest importance especially in the Terai region. Thousands of small-scale farmers keep a few milk cows and buffalos for milk production. Every day the milk is taken to local milk collection points, some of which are equipped with some test equipment and a chilling unit.

From there the milk is collected by the milk processors like the public body Dairy Development Corporation (DDC) or private dairy firms. The main bottleneck of many farmers is the small number of cows which they own and their low productivity. In combination with the small profit margin (due mainly to high cost of feeds)the milk producing activity is hardly able to sustain the farmer families.

Finally it can be said that through this tripartite arrangement a win-win situation for all involved cooperating organizations has been created: the cooperative members obtain access to investment capital without provision of physical collateral, the cooperative is able to multiply its trade volume, the DDC can secure its reliable supply of raw milk and the Himayala Bank runs a successful loan project in a deprived sector.

In addition, Siddhi Milk Producer Cooperative and some other milk producer cooperatives in Rupandehi district provide also direct value chain finance to their members. This is in the form of advance payments on milk to be delivered. This service is funded from own sources of the cooperative. The cooperative deducts the loan installments from the sales price of milk which is delivered by the borrowing member. The balance amount is deposited in the operational account of the member in the cooperative.

Multi-purpose cooperatives as providers of comprehensive services for value chain development: Bukonzo Joint Cooperative Microfinance Society Ltd in Uganda

SNV provides capacity development to local organizations such as cooperatives to enable them better serve their members. It focuses on reducing poverty by increasing production, employment and equitable income opportunities.

Bukonzo Joint Cooperative Society (BJCS) is a self-initiative to improve returns by the local communities from coffee and milk through organized marketing systems, resource mobilization and quality management. It started operations in 1999 as a production and marketing cooperative focusing on coffee and honey. Its current focus has expanded to include financial services and skills development as embedded services.

The project approach is aimed at maximizing returns through the support to major activities in the value chain and through utilizing undeveloped financial markets (credit, savings, insurance etc.) to meet the needs of the small scale farmers, processors and marketers. To this end 3 semi-autonomous units were formed each providing a different service: skills development, access to finance and marketing services.

❖ Bukonzo Organic Farmers Marketing Association (BOFMA) for storage and marketing.
❖ Bukonzo East Training Team (BETT) for extension, BDS and community mobilization.
❖ Bukonzo Joint Cooperative Microfinance (BJCM) SACCO for financing the other two components.

The following presents the specific services which are provided to fulfil the financial and nonfinancial needs of the members and of the other value chain actors.

Fig 2.2 Specific Services Provided to Fulfil Needs of Value Chain Actors
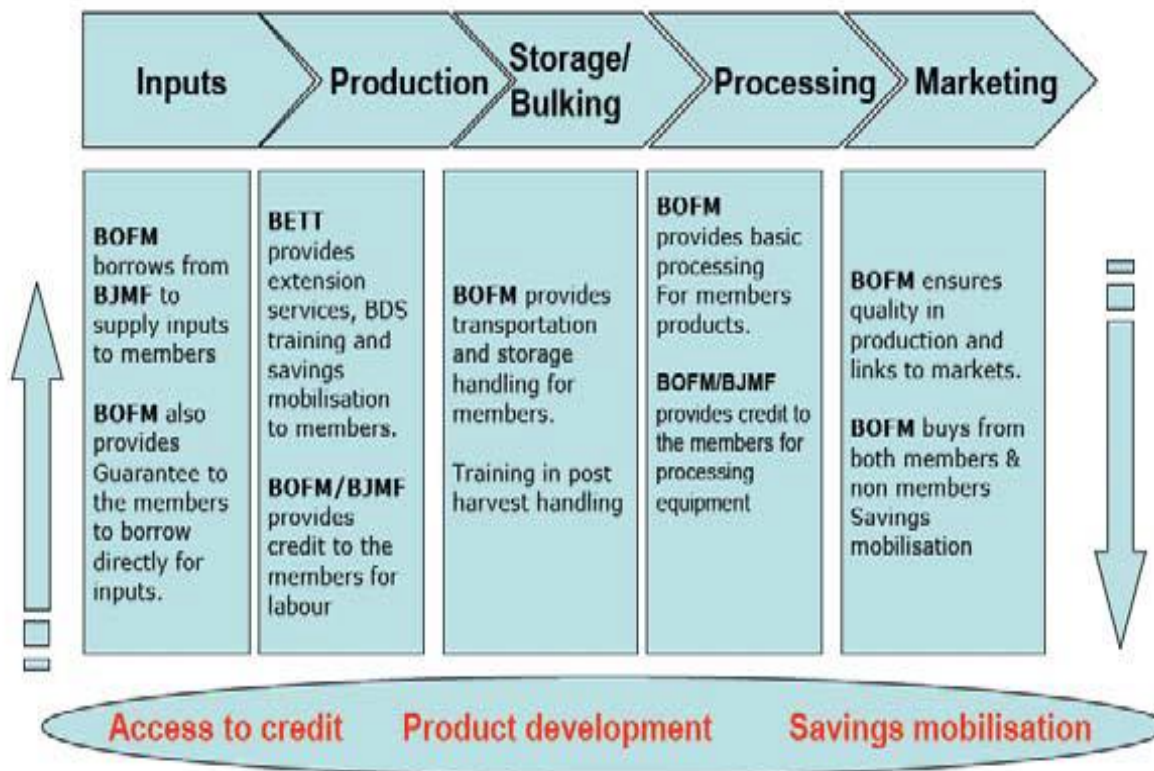
Source: SNV, Uganda, 2010

2.3.2 An Integrated Value Chain Finance in Agriculture: Experience of Agricultural Cooperatives in Korea

Many factors have contributed to the development of the value chain finance system in Korea with the pivotal role of National Agricultural Cooperative Federation (NACF) in agricultural input market and output market as well as in financial market (APRACA FinServAccess Project, 2012 Katmandu, Nepal).

Firstly, it should be noted that the government policy, in most cases, has been favorable to the integrated value chain financing system. The Farmland Reform, implemented under the principle of "land to the tillers" in 1950's, enabled former tenant farmers to get secured loan. Farmland Mortgage Act of 1962 allowed cooperative institutions to take the farmland as collateral while the commercial banks were prohibited from financing on farmland mortgage. This Farmland

Mortgage Act together with the Usurious Loan Relief Program and the establishment of the multipurpose cooperative system through the merger of the former NACF and Agriculture Bank, became an important basis for the development of integrated value chain finance system. Moreover, the implementation of agricultural credit guarantee program since early 1970's has been an important factor that stimulated the improvement of value chain finance.

Second, the NACF and its member cooperatives were successful in securing financial resources for value chain finance. Agricultural cooperatives promoted "a spoonful of rice movement" and monthly/annual Savings Days were celebrated nationwide to sensitize the virtue of diligence saving. The NACF operated banking branches in urban area in order to obtain financial resources for financing in agricultural value chain. Most of the local governments at county level and some of the national level public institutions have designated the NACF as their main bank and their savings deposit has accounted 30-40 percent of the total savings deposit received by the NACF. The growth of mutual credit by primary agricultural cooperatives, development of cooperative insurance, and the introduction of the interest-compensated loans have been important factors that stimulated the development of value chain finance.

Third, the NACF and its member cooperatives succeeded in taking advantage of the multipurpose cooperative system. It was generally noted, among most Korean farmers, that taking the advantages of the multipurpose cooperative system was inevitable to get rid of the extreme poverty of predominantly subsistence small scale farming. Some of the advantages, the multipurpose cooperatives system or integrated value chain finance had, include:

❖ It reduces transaction costs and risks in value chain financing by reducing the need of collateral and financial status inquiry and so on;
❖ It can increase the turnover ratio of financial resources; and
❖ It enhances synergy effect through economy of scope as well as economy of scale.

Fourth, it seems to be important to recognize that concerted and harmonized efforts among different ministries, agencies and institutions for the rural development could facilitate the role of the integrated value chain finance. It is observed in many developing countries that agricultural production, farm input production such as fertilizers and farm machinery, agricultural finance, agricultural cooperatives, and processing/marketing/trade of agricultural products are

regulated/supported by different institutions. For the coordination among the related agencies for agricultural finance, the NACF included Minister of Agriculture, Minister of Finance, and Deputy Governor of the Bank of Korea (the central bank) in its Board members in1960's. In 1970's, the Saemaul Undong or New Village Movement contributed to the harmonization/coordination of various programs for agricultural development.

Fifth, the NACF and its member cooperatives have made great efforts to develop their human resources and management through diversified training and education. In addition, they were successful in maintain the public reputation and public confidence on their business activities. Many illegal uses of the NACF brand by private businessmen may be the evidence of the competitiveness of the NACF brand. Nevertheless of the past development, it must be noted that there have existed pros and cons of the integrated value chain finance system in Korea. Major criticism on the NACF and the integrated nature of the multipurpose cooperative system include:

❖ It lacks the specialization and division of labor in each business area due to the complex and diversified role of the NACF and its member cooperatives;
❖ It became a dinosaur business organization hampering speedy adjustment toa changing economic and social environment; and
❖ Korean agricultural sector has faced with the financial market where excessive money supply prevails compared with excessive demand for money in the past when the multipurpose cooperative system was successful.

It is true that the integrated value chain system appreciated as successful in the process of economic and social transformation from a very poor subsistent agriculture to commercialized modern agriculture may not necessarily guarantee the success in the future. Therefore in 2012, the NACF made an effort to reengineer its organizational structure. The most noticeable change was the separation of finance business and economic business in terms of legal framework. The new system has not been completely settled down and thus it is too early to assess it. It is certain that a value chain finance system successful in a country or in a certain time may not always be successful in other countries or in other time context although some useful lessons or implications can certainly derived from the success or failure experiences of a country.

The empirical literature reviewed in this section explained the experiences of different countries on value chain financing. Thus, this study attempted to examine which value chain financing could be applicable and identify major factors affecting integrated milk value chain financing from Ethiopian context.

2.3.3   Role of Cooperatives in Dairy Development: Indian Experience

Operation Flood was a rural development program started by India's National Dairy Development Board (NDDB) in 1970. One of the largest of its kind, the program objective was to create a nationwide milk grid, helping reach milk to consumers in 700 towns and cities. The bedrock of Operation Flood has been village milk producers' cooperatives, which procure milk and provide inputs and services, making modern management and technology available to members. Currently, cooperative membership comprises about 13 million farmer members of which 3.4 million are women. These farmers comprise 122 534 village level societies, spread over 346 districts, federated at the union level by 170 milk unions, which are federated at the state level; state federations are in turn linked to the Mother Dairy at the national level.

Cooperatives are involved in all aspects of dairying: breed development; providing health care by training the cooperative society president at the village level; ensuring availability of subsidized fodder; collection of milk, processing and marketing of milk and other dairy products. The activities for dairy development funded by the government are undertaken by the cooperatives. They have played a critical role in strengthening the milk sector in India through Operation Flood. Each state has a milk cooperative formed on the lines of the "Anand" pattern. The cooperatives in different states sell under separate brands like Amul (Gujarat), Vijaya (Andra Pradesh), Verka (Punjab), Saras (Rajasthan), Nandini (Karnataka), Milma (Kerala) and Gokul (Kolhapur), which are among those that have earned customer confidence. The performance of the state cooperatives varies significantly across states. The most successful cooperative is the Gujarat cooperative in terms of being a good representative of farmers' interests, as well as in product development and profitability (Chandra and Tirupati, 2003).

2.3.4 The 10 Lessons from Kenya's Remarkable Cooperatives

    i.   Steal a good idea from the British and turn it against them

    ii.   The government can help—or hurt

    iii.   Co-ops must also organize themselves

    iv.   Co-ops come in many forms

    v.   Democracy is a skill we need to learn and practice

    vi.   You still need to think like a business

    vii.   Don't just adapt to capitalism, change the game

    viii.   Cooperate locally, network globally

    ix.   Co-ops are not a magic fix for inequality

    x.   Pay attention to participants' motives

2.3.5 Milk Production and Marketing System in Ethiopia

The Ethiopian cattle herd is mainly for milk production and are kept in all of the farming systems of the country by pastoralists, agro- pastoralists, and crop-livestock farmers. Following Redda (2001), milk production systems can be broadly categorized into urban, peri-urban and rural milk production systems, based on location. The rural dairy system is part of the subsistence farming system and includes pastoralists, agro-pastoralist, and mixed crop-livestock producers mainly in the highland areas. The system is non-market oriented and most of the milk produced in this system is retained for home consumption. The level of milk surplus is determined by the demand for milk by the household and its neighbors, the potential to produce milk in terms of the herd size and production season, and access to a nearby market. Both the urban and peri-urban systems in Ethiopia are located near or in proximity of Addis Ababa and regional towns and take the advantage of the urban markets. The peri-urban milk system includes smallholder and commercial dairy farmers in the proximity of Addis Ababa and other regional towns. This sector controls most of the country's improved dairy stock (Mohammed et.al. 2003).

The dairy sector in Ethiopia can also be categorized based on market orientation, scale and production intensity. Accordingly, three major production systems have been identified as

traditional smallholders, privatized state farms and urban and peri-urban systems. Among these the traditional smallholder system, which produce majority milk produced in the county, largely dependent on the indigenous breeds such as native Zebu cattle, which are characterized by low productivity, yielding about 400-680 kg of milk /cow per lactation period (Alemu*et al*., 2000). The urban and peri-urban milk production system includes small and larger private farms in urban and peri-urban areas, concentrated in the central highland plateaus (Getachew and Gashaw, 2001). This sector is commercial and mainly based on the use of grade and cross breed animals that have the potential to produce 1120-2500 liters over 279 days lactation period (Holloway *et al*., 2002).

The total milk production in Ethiopia increased during the 1961-2000 period at an average annual rate of 1.55 percent, though per capita production declined as a result of the high population growth rate. However, during the period of transition to a market-oriented system in one decade, production is growing at even higher rate (3.0 percent). The increased coverage of extension services (such as better management skills) and increased use of improved inputs (improved breeds and feed) and policy changes promoting dairy production have contributed to faster growth of output. The emergence of private processing industries and marketing units is likely to stimulate producers in the peri urban areas and rural production systems as it offered producers a new market for their milk production (Mohamed et al., 2004).

Currently in Ethiopia, according to CSA, cattle are the main source of milk production, although small quantities of milk are also obtained from goat and camel in pastoral areas. The total cattle population is estimated at about 52.13 million out of which 484thousand (0.93%) and 64 thousand (0.12%) are cross and exotic breeds, respectively. According to recent reports of Central Statistics Agency the cow milk production of the nation estimated about 3.33 billion liters from 10.6 million milking cows with an average 1.54liters per cow per day over a lactation period of 180 days (CSA, 2012).

As is common in other African countries (e.g., Kenya and Uganda), milk and other dairy products in Ethiopia are channeled to consumers through both formal and informal marketing

systems (Mohammed et al., 2004). The informal market involves direct delivery of fresh milk by producers to consumer in the immediate neighborhood and sale to itinerant traders or individuals in nearby towns. In the informal market, milk may pass from producers to consumers directly or it may pass through two or more market agents. The informal system is characterized by no licensing requirement to operate, low cost of operations, high producer price compared to formal market and no regulation of operations. The relative share and growth of the formal and informal market in the three phases was different. In all three phases, the informal (traditional) market has remained dominant in Ethiopia (Redda, 2001).

Milk marketing is an incentive for farmers to improve production. It stimulates production, raise milk farmers' income and living standards and create employment in rural areas (Asaminew, 2007). The sale price of pasteurized milk changed from time to time. Until the1980's, the DDE (Dairy development Enterprises) charged a price of 0.7 Birr per litter. The price of milk increased from 1.00 Birr in 1985/1986 to 1.70 Birr in 1990. However, the wide gap between production and sale of milk by DDE during the 1980-1990 reflects the failure of DDE to efficiently market its products. During the period of transition to a market-oriented system in one decade, the marketing situation has improved and almost all the output was marketed. The survey result conducted by Mohammed et al. (2004) revealed that in addition to DDE, several private milk-processing plants have been established in Addis Ababa, two of which Sebeta Agro and Dinsho dairy industries have already started marketing their products. Although their share of the market is still small compared to DDE.s, the entry of private firms in the formal milk market is a significant development indicating the profitability and potential of private investment in Ethiopia dairy and that the policy environment is facilitating such entry.

In 2000 the Ethiopian dairy product line consisted of pasteurized milk and butter. The period of 2005 –2010 has been a time of subtle transition for the Ethiopian dairy sector. There has-been an increase in processing capacity which has been accompanied by an increase in dairy product lines. In 2010 consumers can find a wider variety of domestic dairy products including yogurt, fruit flavored yogurt, UHT milk, ice cream, cultured milk, and cheeses such as mozzarella,

provolone. Mama dairy offers 32 dairy products to its customers in 2010 compared to a product line of 12 products in 2006 (O'lakes10).

Currently all dairy farms and processors are privately owned in Ethiopia (EIAR and ILRI, 2012) and according to report of O'lakes (2010), there are 18 registered private milk processors in the greater Addis milk shed. The capacities range from less than 1,000 liters per day to 60,000 liters per day. Current milk processed is estimated to be 150,000 liters per day. In very few cases are the milk plants operating at full capacity. With the exception of the former state owned enterprise, Lame/Shola Dairy, and Mama Dairy, all of the other dairy processing facilities are less than 10 years in operation and many of those competing for market share in Addis Ababa are less than 5 years old (O'lakes, 2010). The main distribution channels to end users are supermarkets, shops, kiosks, restaurants and other outlets. The major product in the sector is liquid milk, and majority of the milk is channeled through the informal market (unpasteurized) (EIAR and ILRI, 2012).

Solomon (2004) conducted a study using marketing cost and margin analysis on performance of cattle marketing system in southern Ethiopia with special emphasis on Borena found that butchers at Addis Ababa (Kera) market received relatively a larger share from total gross marketing margin amounting to 69.5%, 63.4% and 61.6% for cattle supplied from Yabelo, Negelle and Dubluk markets, respectively. Regarding producers' portion, which is the portion of the price paid by the end consumer that goes to the producers, he found that the highest percentage was found for cattle supplied from Dubluk market (21.9%), and followed by Negelle and Yabelo characterized with gross margins of 20.6% and 18.6%, respectively. The study conducted by Gizachew (2005) in Ada'liben in district of Oromiya Region using concentration ratio identified milk market to be weakly oligopolistic of 41.2%, where the four firms dominating milk market. The dairy cooperative got 28.3% of market share and the three processing industries combined have a market share of 12.9%. Itinerate traders got net marketing margin of 7.6% for butter and the dairy processing enterprises got the highest net marketing margin (19.9% of retail price) while the least marketing margin (1.05% of the retail price) was obtained by the dairy cooperative.

2.4 Value Chain Finance Framework

As per the publication jointly produced by Royal Tropical Institute (KIT) and International Institute of Rural Reconstruction (IIRR), titled VALUE CHAIN FINANCE, Beyond Microfinance for Rural Entrepreneurs, A value Chain Finance Framework is described below:

❖ **Value chain finance combines two worlds** – the world of value chain actors with the world of specialized financial service providers. The more these two worlds are connected, the more they benefit from each other:

❖ **Smallholder farmers, traders, processors and other chain actors -**can improve their access to financial services. Previously they might be excluded from bank loans due to a lack of collateral, a perception of high risk, or other barriers. But now they can obtain external finance based on the fact that they have a small but viable business that forms part of a wider and more stable system of value creation – the value chain.

❖ **Financial institutions -** can develop whole new markets for their services. Smallholder farmers, traders, processors and agribusinesses become bankable clients. In many developing countries, agriculture is the backbone of the economy. Therefore, the ability to serve this sector greatly increases the scope of action for financial institutions.

Figure 2.3. Value Chain Finance
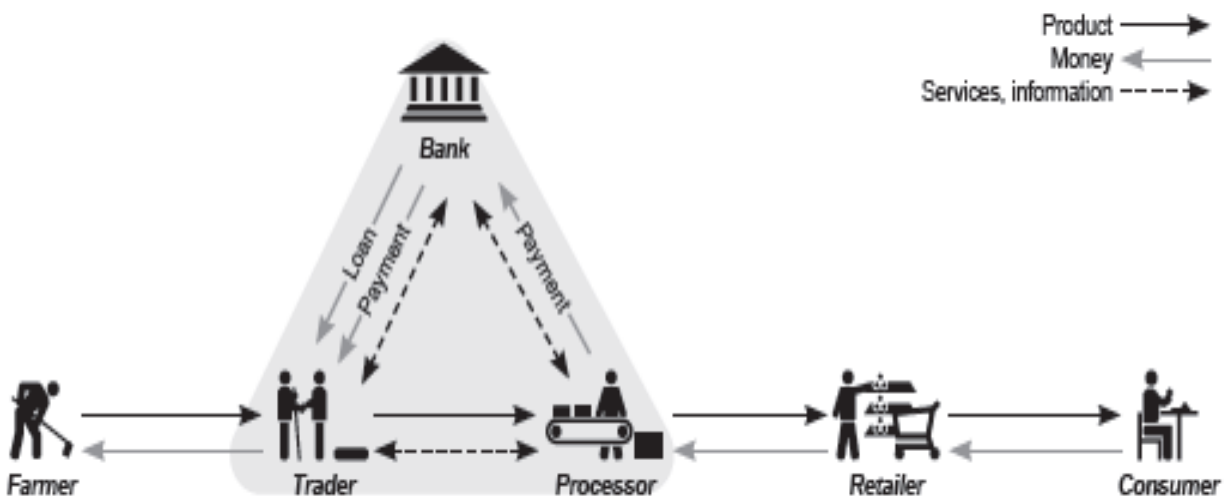
Source: (EIAR and ILRI, 2012)

The Triangle of Value Chain Finance

In value chain finance, a financial institution engages with the actors in the chain. This creates a triangle of cooperation (Figure 2.3). The triangle is between the seller, the buyer, and the financial institution.

Together they make an agreement which covers four essential aspects:

- ❖ The *product* that is produced and sold
- ❖ The *finance* needed to produce and deliver the product
- ❖ The way the parties communicate and exchange *information*
- ❖ The way *risks* are managed.

In practice we often see that multiple actors from the value chain are involved. Not only the farmer, but also the trader and the processor, the wholesaler and the retailer need finance. For the value chain to work well, there need to be proper financial services at all stages of the value chain.

When more actors are involved, the triangle grows to become a chain of value chain finance. This is because the various stages in the value chain needs various forms of financial services at the same time. Each financial services requires specific capacities, also various financial agencies might be involved at the same time.

The Chain of Value Chain Finance

So far, we discussed value chain finance as a triangle of cooperation between the financial agency, the buyer and the seller. But in practice we often see that multiple actors from the value chain are involved. Not only the farmer, but also the trader, the processor, the wholesaler and the retailers need finance. For the value chain to work well, there need to be proper financial services at all stages of the value chain.

Often we see that various financial institutions are involved at the same time. This is because each financial institution has a specialization. Credit cooperatives are specialized in working with smallholder farmers. Microfinance institutions are strong in working with small-scale traders. Banks are good at financing larger companies. So we often see that multiple financial institutions offer financial services to the value chain actors.

When more actors are involved, the triangle grows to become a chain of value chain finance. This is because the various stages in the value chain needs various forms of financial services at the same time. Each financial services requires specific capacities, therefore also various financial agencies might be involved at the same time.

Reorganization of the Value Chain

Value chain finance is not simply a matter of pumping money into the value chain. On the contrary, when financial institutions engage with the value chain, they do so to make the chain more efficient and competitive. Value chain finances a deliberate intervention that restructures and reorganizes the value chain. It triggers significant changes in the flows of money and information in the chain, in the services provided to the chain, and sometimes even in the product flow itself.

Risk Management

Financial institutions are reluctant to provide loans to rural entrepreneurs because they perceive high risks in agricultural production and trading. The most important sources of risks in the agricultural sector are: Production risk, Price risk, Market risk, Default risk, Currency risk, Other risks (Political and Legal environments).

Value chain finance is a way to manage and mitigate these risks on the basis of strong collaboration in the value chain. When farmers, traders, processors, retailers and other chain actors work together, they can jointly reduce the risks that each of them faces in their businesses.

Value chain finance has the benefit of reducing risks by promoting better coordination between the buyer, seller and financer. In financial jargon, value chain finance reduces credit risks into performance risks. The risk of a farmer being unwilling to pay off a loan (a credit risk) is much higher than that of the farmer being unable to produce a certain volume of produce (a performance risk). The risk of a trader not paying off a loan (credit risk) is much higher than that of the trader stopping his trading activities (performance risk).As the risks are reduced, it becomes more attractive for the financial agent to provide loans to the actors in the value chain. Also, as the risks are lower, the interest rates on the loans can be reduced, which is to the benefit of the actors in the value chain.

From the theoretical, methodological and empirical literatures and experiences of different countries, this study attempted to investigate factors affecting milk value chain financing in Ethiopia with a representative reference of Sululta area to suggest good practices and examples which could be replicated in other countries. Accordingly, the literatures reviewed in this chapter will be used to formulate the appropriate framework and business model for the milk value chain financing in Ethiopia in the case of Sululta area.

2.5   Conceptual Framework

Based on the literature review and the author's knowledge of the study area, the participation decision of the household in credit market and its utilization in milk production and marketing is hypothesized to be influenced by demographic, socio economic and institutional factors. And access to credit and other inputs affect the value chain of milk. With this ground, the diagrammatic representation of the conceptual framework applied for this study is represented in the figure below.

Figure 2.4. Conceptual Framework of the Study


```
                    ┌──────────────────────────┐
                    │   Institutional Factors  │
                    └──────────────────────────┘

┌──────────────┐         ┌─────────────────┐         ┌──────────────────┐
│ Demographic  │         │ Access to Credit│         │ Socio-economic   │
│ Factors      │────────▶│                 │◀────────│ Characteristics  │
│              │         └─────────────────┘         │                  │
│ ➢ Age        │                                     │ ➢ Land Holding   │
│ ➢ Sex        │         ┌─────────────────┐         │ ➢ Crop Income    │
│ ➢ Family Size│────────▶│ Level of Credit │◀────────│ ➢ Number of      │
│ ➢ Education  │         │ Utilization in  │         │   Livestock      │
│ ➢ etc        │         │ Milk Production │         │ ➢ etc            │
└──────────────┘         └─────────────────┘         └──────────────────┘

                    ┌──────────────────────────┐
                    │      Milk Value          │
                    │        Chain             │
                    └──────────────────────────┘

        ┌───────────────────────────────────────────────────┐
        │ Actors of Milk Value Chain and Their Roles        │
        │                                                   │
        │ ➢ Major Actors (farmers, cooperatives,            │
        │   processors)                                     │
        │ ➢ Supporters (Financial sectors & NGOs            │
        └───────────────────────────────────────────────────┘
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Source own sketching (2016)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Description of the Research Area

Location

Sululta district is one of the six districts of Oromia Special Zone Surrounding Finfinne of Oromia National Regional State. The districts' capital town, Chancho, is 40 kms away from Addis Ababa towards the North-west. According to CSA (2012), population of the district was about 149,494 (male 74,753 and female 74,741). Concerning the land use pattern, out of the total area of the district which is 109,269 ha, about 26,662 ha (24.4%) is cultivated land, and 15,145 ha (13.9%) is covered by forest, bush and shrub land, 38,720 ha (35.4%) is grass lands, and 28,742 (26.3%) are other land use types.The district is bordered with different districts of North Shewa zone; Welmera in the West, Wuchale in the North, Jida in the East, Addis Ababa city administration in the South (SDAO, 2012).

Figure 3.1 .Map of Oromia National Regional State and Study Area
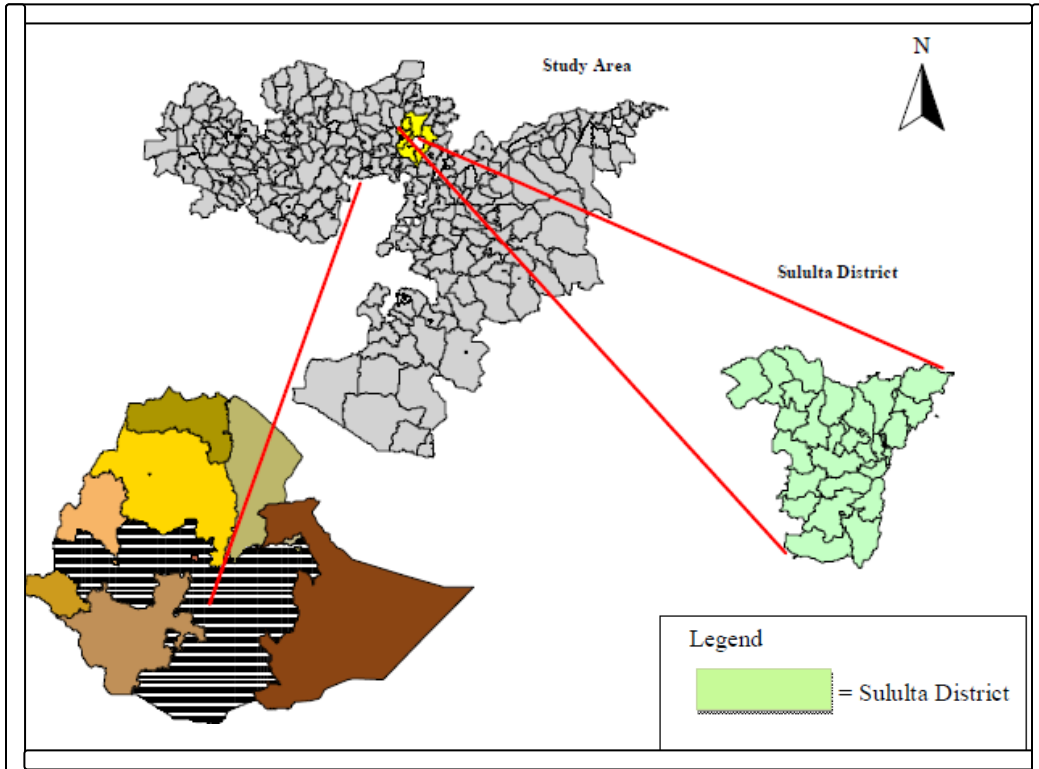
Source: Ethio-GIS (2012)

Agro Climatic Condition

The altitude of the district ranges from 2851 to 3700 meters above sea level. The highest annual rainfall is 1447 mm with mean of 1140 mm and minimum of 834 mm. In the area, the months with high rainfall are (July to September) with low temperature, whereas the temperature is high in the months between Decembers to March. The farming system of the district is rain-fed and mixed agriculture (SDAO, 2012).

Farming System

Livestock husbandry and crop production are the predominant economic activities and the major source of livelihood in the district. The main farming of the study area is livestock rearing followed by crop production, mostly cereal crops such as barley, wheat, teff, and pulse crops such as horse bean, pea, lentil and others growing in the district. The livestock feed resource is hay, crop residue and grazing land. The total cattle population in the district is estimated at 224,600 (15% are cross-breed) (SDAO, 2012).

The district has 23 kebele administrations, 3 sub-towns (Chancho, Dubar and Derba), and 22 Farmer Training Centers, 64 development agents and 68 different types of cooperatives. From these cooperatives in the district, 12 are primary dairy cooperatives affiliated to the Selale Dairy Cooperative Union (SDCU, 2012).

3.2   Sampling Design

Sululta area is selected for the study on the basis of its milk production potential and the presence of various dairy marketing actors that contributes to value chain financing of the dairy commodities in the area. The major actors who were interviewed in order to collect the necessary information for the assessment of milk value chain financing research include the following:

Milk Producer (Farmers) Sampling:

Selalle district was selected on the basis of relative milk production, sales potential and access to credit providing institutions. To conduct formal survey with milk producers, two-stage sampling procedure was employed to select milk producer households. In the first stage, 6 kebeles were randomly selected from this district by using stratify random sampling procedure based on their number of dairy cows owned (local and cross breed). In the second stage, a total of 120 sample respondents were randomly selected from the sampling frame of milk producers of six kebeles by using simple random sampling technique. Taking the number of households in each kebele into account, the sample size of respondents was allocated for six kebeles based on probability proportional to size.

The determination of sample size was based on of Yamane`s (1967) sampling formula with 90 percent confidence level.

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

Where,

n: sample size for the researcher use.

N: total number of households in six *kebeles* = 4,356

e: designates maximum variability or margin of error = 0.05-0.1% (for this research=0.09 was used).

e = 0.09 was taken as margin error. It was taken because, as "e" gets approach 0.05 the sample size get larger and larger and as a result it becomes difficult to manage it.

Using the above formula, the total sample size of the dairy farmers from the six *kebeles* will be 120 which is determined as follows:

$$n = \frac{4356}{1+4356\,(0.09)^2} = 120$$

Table 3.1 Sample Distribution of Milk Producers

Kebele	Number of Total Population	Number of sampled Producers
Chancho Buba	835	23
Gorfo	814	22
Moye Gajo	634	17
Waju Dalo	858	24
Wererso Malima	687	19
Wererso Galayi	528	15
Total	**4,356**	**120**

Source: Sululta District Agricultural Office and PA administrations, 2012

The Other Three Major Actors of Milk Value Chain Financing (Cooperatives, Processers, Financial Institutions and NGOs) Sampling:

The 10 cooperatives who collects raw milk from the producers (farmers) and provides for the two milk processers in Sululta area, and the 2 milk processing industries (Selale Cooperatives Union and Elemtu Milk Processing Industry) were interviewed about their performance, purchase and selling practice of milk.

In addition, the value chain supporters which include the 2 financial institutions (Cooperative Bank of Oromya and Oromya Saving and Credit Microfinance) and the 2 *NGOs (Livestock Market Development, LMD and SNV) were* communicated to give their opinion on the extent of the role of NGOs for the integrated milk value chain financing.

3.3   Data Types, Sources and Methods of Data Collection

The study used primary and secondary data that the primary data were obtained through questionnaires from main value chain actors who are milk producers. Data enumerators were employed who knows the Oromifa language and familiar with the language and culture (*Afan Oromo*), of the community, to conduct the interview as a matter of fact that the farmers in the study area are speakers of Oromia language. Briefing for the data enumerators regarding the

objectives of the study were done to make them understanding the content of the questionnaire and how to approach the respondents to conduct the interview to capture important data that were necessary for the analysis and the questionnaire has been tested. Secondary data were collected from different relevant offices and through reviewing documents and publications

3.4   Methods of Data Analysis

3.4.1 Descriptive Analysis

Structure-Conduct-Performance (S-C-P) model

The model examines the differential- relationship between market structure, conduct, and performance, and is usually referred to as the structure conduct and performance (S-C-P) model. In agricultural economics, the most frequently used model for evaluating market performance is based on the industrial organization model. Wolday (1994) also used this model to evaluate food grain market in Alaba Siraro district. Furthermore, study conducted by Hakobyan (2004) used the Structure-Conduct-Performance analysis for identifying factors that determine the competitiveness of dairy market, behavior of firms, and the success of dairy industry in meeting performance goals. Thus, this study used S-C-P model to evaluate the efficiency of dairy market in the study area.

Structure

According to Scott (1995), four salient aspects of market structure could be identified: degree of seller concentration, degree of buyer concentration, degree of product differentiation, and the condition of entry to the market. Market concentration is defined as the number and size of sellers and buyers in the market (Scott, 1995). The greater the degree of market concentration, the greater the possibility of non-competitive behavior in the market will be.

The concentration of firms in the market is estimated using the common measure of market concentration ratio, which refers to the number and relative size of buyers in the market. The concentration ratio used to study the structure of the market was calculated using the following formula:

$$S_i = \frac{V_i}{\sum V_i} \qquad\qquad\qquad\qquad\qquad\qquad (2)$$

Where:

S_i = Market share of buyer i

V_i = Amount of product handled by buyer i

$\sum V_i$ = Total amount of product handled

$$C = \sum_{i=1}^{r} S_i \qquad\qquad i = 1, 2, 3, 4 \dots r \qquad\qquad (3)$$

Where:

C = concentration ratio

S_i = the percentage market share of the i^{th} firm and

r = is the number of largest firms for which the ratio is going to be calculated.

Bain (1968) contends that a barrier to entry is simply any advantage held by existing firms over those that might potentially produce in a given market. Potential entry barriers would be investigated based on demand conditions, product differentiation, absolute unit-cost advantages, legal and institutional factors, economies of scale, capital requirement and technological factors.

Conduct

Market conduct defines the conditions which make possible competitive or exploitative relationships between sellers and buyers. Competitive forces are directed by market forces. Exploitative relationship is done via unfair price-setting practices including collusive, predatory, or exclusionary.

Performance

Market performance involves an assessment of the extent to which the economic results of an industry's market behavior deviate from the optimum contribution it could make to achieve the accepted goals of society (Kohls and Uhl, 1985; Ford Foundation, 2007). It also refers to the impact of structure and conduct on prices, costs, and volume of output (Pomeroy and Trinidad,

1995). Marketing efficiency is essentially the degree of market performance. It is defined as having the effectiveness with which a marketing service would be performed and the effect on the costs and the method of performing the service on production and consumption.

Market performance can be evaluated by analyzing costs and margins of marketing agents in different channels. A commonly used measure of market performance is the marketing margin or price spread. Margin or spreads can be useful descriptive statistics if used to show how the consumer's price is divided among participants at different levels of the marketing system.

Because costs are often both cash costs and imputed costs in many agricultural marketing chains; the net marketing margin are not advised rather the gross to be calculated (Mendoza, 1995). In this study, gross marketing margin has been considered instead of net marketing margin. A marketing margin is the percentage of the final weighted averages selling price taken by each stage of the marketing chain. The total marketing margin is the difference between what the consumer pays and what the producer receives for his product. That means, it is the difference between retail price and farm price (Cramers and Jensen, 1982). Computing the total gross marketing margin (TGMM) is always related to the final price paid by the end buyer and is expressed as percentage (Mendoza, 1995).

$$TGMM = \frac{Pc - Pp}{Pc} \times 100 \qquad\qquad (4)$$

Where, TGMM= Total gross marketing margin;

Pc = Consumer price (end buyer price); and

Pp = Producer price (first seller price)

It is also necessary to determine portion of the price paid by the consumer that goes to the producer and the producer's margin which is called 'producer's gross margin' (GMMP). It is calculated as:

$$GMPP = \frac{Pc - TGMM}{Pc} \times 100 \qquad\qquad (5)$$

3.4.2 Econometric Analysis

Double Hurdle Model

The double hurdle model is firstly proposed by Cragg (1971) for dependent variables with many zero observations with the assumption of that household makes two decisions with respect to purchasing an item, each of decision is determined by a different set of explanatory variables. In the case of expenditure, the household first makes a decision whether to purchase the good and then by considering an explanatory variables such as information and transaction cost they decide how much to purchase of good. In fact, the two decisions also have been modeled as sequential (Lee and Maddala, 1997), but most studies treat the decisions as separate.

Since the introduction of Double hurdle model by Cragg (1971), it has been used widely in a variety of areas. This includes the study of Newman et al. (2003) applied the double hurdle model to study Irish household expenditures on prepared meals for home consumption; Vredin-Johansson (1999), who analyzed charitable donations, and Moffatt (2003), who modeled loan defaults, and Yen and Jones (1997) used the procedure for analysis of U.S.A household consumption of cheese.

This study used double hurdle model to determine whether the household participate in formal credit market and its determinants in the first hurdle and then the determinants of the amount of borrowed money spent for milk production and marketing is determined in the second hurdle. For the first hurdle, the dependent variable takes either 0 or 1 value. According to Heckman (1979), and Flood and Gråsjö (1998, 2001), the function is:

Participation Decision:

$$Y_i^* = \beta_1 X_{1i} + \varepsilon_i, \quad \varepsilon_i \sim N(0, 1) \tag{6}$$

$$y_i = \begin{cases} 1 & if \ Y_i^* > 0 \\ 0 & if \ Y_i^* \leq 0 \end{cases} \tag{7}$$

Level of Participation Decision

$$Y_j^* = \beta_2 x_{2i} + \mu_i, \quad \mu_i \sim N(0, \delta^2) \tag{8}$$

$$y_j = \begin{cases} y_i^* & if \ Y_i = 1 \ and \ Y_j^* > 0 \\ 0 & else \end{cases} \tag{9}$$

Hence, x_1i and x_2i are vectors of explanatory variables that affect these two-stage decisions, respectively. Both variables are also assumed to be uncorrelated with their respective error terms εi and μi. β_1 and β_2 are the corresponding vectors of parameters. While di is a latent index variable that denotes binary censoring, di is the observed value representing the individual's participation decision (i.e., if 1 it means the respondent is participating ($d_i * > 0$, else 0). Equation 9 indicates that the level of participation, Yi=0 when there is censoring at zero (yi*=0) due to faulty report or if the household uses all credit for non-milk production purpose. Hence, a positive level of credit participation for milk production is observed if only a household participates in a credit market and utilizes the credit for milk production.

Assuming the error terms in equation 6 and 8 are independent, the stochastic term can be written as:

$$\begin{bmatrix} \varepsilon i \\ \mu i \end{bmatrix} \sim N \begin{bmatrix} \begin{bmatrix} 0 \\ 0 \end{bmatrix} & \begin{bmatrix} 1 & 0 \\ 0 & \delta^2 \end{bmatrix} \end{bmatrix} \qquad (10)$$

3.5 Hypothesis and Variables Definition

In order to explain the credit participation decision of household and level of utilization for milk production, continuous and discrete variables were identified based on economic theories and the findings of different empirical studies. Accordingly, in order to investigate the research questions of this study, the following hypothesis and variables definition were constructed:

Based on economic theories and different researches conducted similar to this study, the following continuous and discrete variables, which are supposed to determine credit market participation decision of household and level of utilization for milk production were determined.

3.5.1 Dependent Variables

The study considers the decision of the household whether to participate or not in a formal credit services and the level of utilization in milk production and marketing as the dependent variable.

Formal Credit Service Participation (FCSP): It is the dummy variable that represents the credit participation of the household either in cash or in kind. It is regressed in the first stage of two stages estimation procedure. For the respondents who participate in credit it takes the value of one where as it takes the value of zero for the respondent who did not participate.

Formal Credit Size (FCS): It is a continuous dependent variable in the second stage of double hurdle model. It is an amount of credit measured in Birr utilized for milk production and marketing which is selected for regression analysis.

3.5.2 Independent Variables

Sex of the Household Head (SEX): This is a dummy variable that takes *a value of 1 if the household head is male and 0 otherwise* and expected to have positive relationship with credit market participation. There is a general belief that women are discriminated against informal credit markets (Buvinic *et al.,* 1979; Morris and Meyer, 1993; Mohamed, 2003). But in the case of Ethiopia the formal financial institutions offer more loans to female headed households than male headed households (Kedir, 2007). Doss and Morries (2001) confirmed that women farmers tend to adopt improved technologies at a lower rate than men because of limited access to information and resources. So due to male exposure to different information and more control over resources, it is expected that male headed households have more access to use formal credit.

Age of the Household Head (AGE): It is a continuous variable and measured using completed years of life in survey time. Farmers having a higher age due to life experience will have much better association with cooperatives and other formal credit institutions, and it is expected that farmers with higher age may have more access to use credit from the formal sources. In contrast, younger farmers are expected to be more entrepreneur, fast decision makers, and have capacity to accept and adopt new ideas, which means farmers with higher age are more reluctant to use new technologies. Therefore, the net effect could not be determined a priori (Lucil *et al.,* 1999). Therefore, the effect of age on credit market participation decision is indeterminate.

Literacy Level of the Household Head (EDU): It is a categorical variable that refers to the formal schooling year of a respondent during the survey period. Cleaver (1993) as cited in Lelissa (1998) described that the level of education of the rural society determines the yield of agriculture over time and between countries. According to Adebabay (2003), Kebede *et al.* (1990) research results education would influence adoption positively and significantly and the study of Hussien (2007), also describes as the low level education of the farm households have contributed for limited use of formal sector credit by farm households. Therefore, literacy is hypothesized to positively influence the participation of house hold in credit market.

Household Family Size (HFS): It is a continuous variable that describes the total number of the household member. Because the household is expected to consume the loan money for personal need, this variable is expected to affect the level of loan money to be utilized in milk production and marketing.

Participation of the Household in Social Organization (PARSO): It is a dummy variable that takes a value of 1 if households participate in leadership of social organizations and 0, otherwise. The participation of farmers in leadership of social organization will increase skill and awareness on the existence and importance of new technology. It also creates an access to information on the use of improved technology. Thus it is hypothesized that it influences credit participation of smallholders.

Land Holding and Size (LHS): This variable represents the total land size hold by a household measured in hectare. It is hypothesized that farmers who have larger land size would generate more income through extensive farming to meet their financial needs of milk production. Therefore a positive influence is expected from land size owned on participation decision of household in credit market.

Crop Production Income (CPI): It is a continuous explanatory variable and refers to the total amount of income obtained from crop production in terms of ETB. It is assumed that households with larger income can have better economic strength to participate and use new technologies than those household own less ETB. This shows the variable is expected to have negative relationship with the amount of credit participation for milk production.

Livestock Holding (LH): It is a continuous explanatory variable and refers to the total number of livestock the household owns in terms of Livestock Unit (LU). Households with larger LU size are supposed to be less dependent in credit market as they can sell their livestock product to meet their financial needs to milk production. Kinde (2007) found that larger LU enables the household to have better financial position and economic strength to purchase sufficient amount of input. Therefore, it may negatively affect both credit participation and level of credit participation for milk production and marketing.

Milk Production Experience (MPE): It is a continuous variable which is expressed in terms of years and refer to the number of years the farmer participated in milk production activity. The farmer with more experience may supply more milk product to the market and get high-income which enables the household to satisfy his financial need from its own income without the use of credit. So this variable may negatively affect the participation of household in credit market.

Access to Agricultural Extension Services (ACAEXS): It is categorical variable which describes the contact number of household head with the extension agents per month in relation to milk production and marketing. The study by Nkonya *et al.,* (1997) revealed that extension contact has an influence on farm households' adoption of new technology. Following these arguments, access to extension service is hypothesized to positively influence farmers 'participation decision in credit services.

Interest to Expand Milk Production (IEMP): It is a dummy variable which indicates the willingness of the household to expand milk production activity. The variable takes the value 1 if the household is willing to expand and if not. The variable positively affects the level of utilization of household in formal credit service.

Distance to the Nearest Credit Institution (DISTCrS): It is a continuous variable measured in Kilometers, which farmers spend to reach to the formal lending institution. The study by Hussien (2007) showed that; the farm households are discouraged to borrow from credit sector if it is located far away from their home. This is because it higher production and transaction cost, especially transportation cost.

Perception of Household on the Effect of Credit on Milk Production (PERCrMP): It is a dummy variable that takes value of 1, if the household head perceives that participating informal credit service has a positive impact on milk production and marketing and 0 if not. The study of Adebabay (2003) and Asrat *et al.*, (2004) shows that, perception of the household positively affects adoption of new ideas and technology. Hence, it is hypothesized that perception is expected to positively influence the level of participation in credit service for milk production.

Marketing Channels to sell Milk Information (MCSMINF): It is a categorical variable which describes the buyer of the milk producer. Farmers marketing decisions are based on market price information, and poorly integrated markets may convey inaccurate price information, leading to inefficient product movement. Therefore, it is hypothesized that the actor who provides the market price information is positively related to market participation and marketable surplus.

Table 3.2 Summary of Variable Definitions, Measurements and Hypothesis

Variable	Description	Type	Variable definition and measurements	Hypothesis
Dependent variable				
FCrSP	Formal Credit Service participation	Dummy	Yes =1, No =0	
FCS	Formal Credit Size	Continuous	Number	
Independent variables				
SEX	Sex of household head	Dummy	Male=1, female=0	+ *
AGE	Age of the household head	Continuous	Years	- ***
EDU	Literacy level of the household head	Categorical	Formal schooling	+ *
HFS	Household Family Size	Continuous	Number	- ***
PARSO	Participation of the HH in social organization	Dummy	Yes =1 No=0	+ *
LHS	Land holding size	Continuous	Hectare	+ ***
CPI	Crop Production Income	Continuous	ETB	- **
LH	Livestock holding	Continuous	Livestock unit	- ***
MPE	Milk Production Experience	Continuous	Years	- *
ACAEXS	Access to agricultural extension service	Dummy	Yes =1 No=0	+ *
PEMP	Plan to expand milk production	Dummy	Yes =1 No=0	+ **
DISTCrS	Distance to the nearest credit service institution	Continuous	Kilometers	- *
PERCMP	Perception of household on the effect of credit on milk production	Dummy	Yes =1 No=0	+ *
MCINFP	Marketing Channels Information Provider	Categorical	Actors in Milk Value Chain	+**

N.B. * indicates factors that determine participation of the household, ** factors that determine size of credit participation and *** considered determine both variables

3.6 Reliability Test

Reliability can be established using a pilot test by collecting data from 20 to 30 subjects not included in the sample. Data collected from pilot test can be analyzed using SPSS or any other related software. SPSS provides two key pieces of information in the output viewer. These are 'correlation matrix' and 'view alpha if item deleted' columns. Cronbach alpha (a) is the most commonly used measure of internal consistency reliability. Conditions that could affect Cronbach values are:

a) Numbers of items; scale of <10 variables could cause Cronbach alpha to be low
b) Distribution of score; normality increases Cronbach alpha value while skewed data reduces it
c) Timing; Cronbach alpha does not indicate the stability or consistency of the test over time
d) Wording of the items; negative-worded questionnaire should be reversed before scoring
e) Items with 0, 1 and negative scores: Ensure that items/statements that have 0 s, 1 s and negatives are eliminated.

The reliability coefficient (alpha) can range from 0 to 1, with 0 representing a questionnaire that is not reliable and 1 representing absolutely reliable questionnaire. A reliability coefficient (alpha) of 0.70 or higher is considered acceptable reliability in SPSS.

Accordingly, the questionnaire was partially adopted with minor customization from previous researches a pre-test was made for reliability. Out of the 21 copies of questionnaires distributed to milk producers at Sululta town 18 questionnaires were completed and returned. The Cronbach Alpha was used to test reliability of the scales used from the pre-test sample. The Alpha coefficient range in value from 0 to 1, the higher the Alpha, the more reliable the test. Usually 0.7 and above is acceptable for internal consistency based on D.L.R Vander Waldt, T. Robello and W.J brown (2009) an alpha coefficient of = 0.79 was obtained. Thus, the data generation was reliable and free of random errors.

CHAPTER FOUR

RESULTS AND DISCUSION

This chapter discusses the result of the findings of descriptive statistics and econometrics analysis of the research to address the research objectives. The descriptive analysis was used to describe the general demographic and socio-economic characteristics of the sampled milk producer households. The market chain analysis of milk market actors and their functions were identified and market structure-conduct-performance of milk marketing is discussed. Econometric model results on factors affecting the sampled milk producer households' participation in the credit service discussed at the end.

4.1 Descriptive Results of Major Actors for Milk Value Chain Financing

4.1.1 Descriptive Results of Milk Producers

4.1.1.1 Socioeconomic Characteristics of Milk Producers

From a total of 120 Milk producing sample households, the credit service participants took the proportion of 54.2% and that of non-credit participants respondents were 45.8%. Out of the total credit participants 97.3% were borrowed from micro finance institution of the district. The demographic and socioeconomic characteristics of the respondents are described below:

Table 4.1: Comparison Test of Continuous Socioeconomic Characteristics By Credit Service Participation

	Mean		
Variable	Credit Service Participants	Non Credit Service Participants	t-value
AGE	40.75	37.4	0.0227*
HFS	5.476	5.69	-0.4873*
LHS	1.046	185.7	-2.1442*
CPI	1492.31	2436.4	-1.9479*
LH	8.615	6.273	2.5845*
MPE	8.185	7.709	0.2541*
DISTCrS	4.015	5.4	-2.8771*

*stands for 5% significance level
Source: own survey result (2016)

Table 4.2: Comparison Test of Categorical Socioeconomic Characteristics

By Credit Service Participation

Variable		Credit Service Participants N = 65	%	Non Credit Participants N = 55	%	Total Sample N=120	%	X^2
SEX	Male	44	67.7	51	92.7	95	79.2%	11.32*
	Female	21	32.3	4	7.3	25	20.8%	
EDU	Illiterate	7	10.8	7	12.7	14	11.7%	5.06*
	Basic Edu	26	40.0	17	30.9	43	35.8%	
	Primary	15	23.1	22	40.0	37	30.8%	
	Secondary	11	16.9	5	9.1	16	13.3%	
	Higher Edu	6	9.2	4	7.3	10	8.3%	
PARSO	Yes	36	55.4	46	83.6	82	68.3%	10.99*
	No	29	44.6	9	16.4	38 0	31.7%	
ACAGEXS	Yes	46	70.8	38	69.1	84	70.0%	
	No	19	29.2	17	30.9	36	30.0%	
PEMP	Yes	53	81.5	53	96.4	106	88.3%	6.35*
	No	12	18.5	2	3.6	14	11.7%	
PERCrMP	Yes	45	69.2	33	60.0	78	65.0%	1.12*
	No	20	30.8	22	40.0	42	35.0%	
MCINFP	Cooperatives Members	29	44.6	30	54.5	59	49.2%	5.08*
	Agent	5	7.7	4	7.3	9	7.5%	
	Retailers	10	15.4	12	21.8	22	18.3%	
	Consumers	1	1.5	0	0	1	0.8%	
	TV & Radio	1	1.5	0	0	1	0.8%	
	Personal Information	19	29.2	9	16.4	28	23.33%	

*stands for 5% significance level

Source: own survey result (2016)

Sex, Age, Marital Status, Family size, and Education Level of the Milk Producer Household

Sex: The total sampled milk producer households were composed of 79.2% male and 20.8% female heads. The non-credit participant's gender proportions were 92.7% males and 7.3% females. From the credit service participants, males comprise 67.7% and females took 32.3%. The mean difference was found to be significant (X^2 = 11.3, p<0.001). As expected in the hypothesis, the result indicates that the males are leading in participating in milk production credit service in the study area.

Age: With regard to the age of the respondents, of the household head of sample respondents ranged from 23 to 63 years with an average age of 39.2 years and standard deviation of 9.5. The mean age of credit participants was 40.75 years while that of non-participants was 37.4 years with the standard deviations of 9.542 and 8.434, respectively. The mean age of credit participants were higher than non-credit participants (t= 2.0223, p <0.0227). Since many of respondents are in young age group, age has positive impact on credit participation if the population proportion is young who are expected to be more entrepreneur fast decision makers and have a capacity to accept new ideas.

Marital status: The marital status of the sampled respondents indicated that, 74.2%, 17.5%, 5.0% and 3.3% were married, single, divorce, and living together respectively. For credit participants 78.5%, 16.9%, 3.1%, and 1.5% were married, single, divorced, and living together, respectively while for the non-credit participants it is 69.1%, 18.2%, 7.3% and 1.5% in the same order.

Family size: The average family size per household for the total sample household was 5.56. The mean family size of non-credit participants were higher than credit participants (t= -0.4873, p < 0.3135). As per the hypothesis family size has a negative impact on credit participation due to the shifting of loan by large size family for consumption than for milk production.

Education Level: Education level of the sample household heads was between illiterate to higher education with a proportion of 11.7% for illiterates, 35.8% basic education, 30.8% were primary school, 13.3% were secondary education and 8.37% were higher education. The education level of credit participants were 10.8% for illiterates, 40.0% basic education, 23.1% were primary school, 16.9% were secondary education and 9.2% were higher education. But for non-participants, the education levels of the households were 12.7%, 30.9, 40.07%, 9.1% and 7.3% for illiterates, basic education, primary education, secondary education and higher education respectively. The mean difference was found to be statistically significant ($X^2 = 5.06$, p <0.281). As expected, households with lower education level less participate in credit market. This could be because less educated household heads are more reluctant to new ideas and risk averters.

Land Ownership and Income from Crop Production of Milk Producer

Land Ownership: from the total respondents, 58.3% were owners of land and the remaining 41.7% did not have their own land. From those respondents having their own land 66.0% were credit participants and 34.0% did not participate in credit service. The percentage was 45.7% and 54.3% respectively for the respondents who did not have their own land. The mean difference was statistically significant ($X^2 = 4.835$, p < 0.028). The hypothesis of the households having larger land size were not participating in credit service since they are able to generate more income to meet their financial needs is acceptable in the study area.

Income from Crop: Crop income had no significant difference for credit participants and non-participants. The mean annual crop income of the sample households was Birr 1925.0 with the maximum of Birr 10,000 and standard deviation of Birr 2676.265 of which average annual crop income of credit market participants was Birr 1492.31 with the standard deviation of 284.303 while the average annual crop income for non-participants was Birr 2436.364 with the standard deviation of Birr 405.985. The mean difference between the participants and non-participants were found to be statistically non-significant (t= -1.9479, p <0.0269).

4.1.1.2 Milk Production Issues of the Farmers

Number of Cows, and Years in Milk Production of the Farmers

Number of Cows: Total livestock unit of the household found to have a significant difference over participants and non-participants. The average total livestock unit of the sample households was 7.542. The mean of credit participants and non-participants were 8.62 and 6.27 respectively. Therefore, those households with lower total livestock unit were found significantly higher credit participation as compared with larger livestock unit respondents (t= 2.5845, p <0.0055).

Years of Experience: The average total years of experience of the sample household were 7.97. The mean years of experience in dairy production of credit participants and non-participants were 8.18 and 7.71 years, respectively. The hypothesis is the household with more experience get high income and not participate in credit service. However, the result shows those who have larger years of experience were participating in credit service in the study area. (t= 0.2541, p <0.3999)

Access and Supplier of Extension Service for Milk Producer

Access to Extension Service: Extension agents are expected to provide information and advice to the farmers, so it is expected to influence credit market participation of households. This study also shows that as contact with extension agents of credit providing institutions significantly influences cash credit participation of the households. Out of the total sampled households, 70.0% get an access to extension agents and the remaining 30.0% did not get extension agents. From the credit participants 70.8% were contacted to extension agents and 29.2% did not get extension service and it was 69.1%, 30.9% for the non-credit participants respectively. The two samples mean comparison test shows that as there was a statistically no significant relationship between contact with agents of extension service providing organizations and credit participation (X^2 = 0.40, p<0.842).

Suppliers of Extension Service: contact with agricultural extension agents positively influences the use of credit for milk production. The suppliers of extension service for the sampled respondents indicated that, 44.2%, 25.8%, 23.3%, 5.8% and 0.8% were by wereda agriculture office, no one, private, NGOs, and cooperatives respectively.

Interest of Household for Expansion of Milk Production

From the total respondents, 88.3% had an interest for expansion of their milk production and the only 11.7% did not have interest to expand their milk production. From those respondents having an interest of expansion 81.5% were credit participants and 18.5% did not participate in credit service. The percentage was 96.4% and 30.9% respectively for the respondents who did not have interest to expand of milk production. The mean difference was statistically significant (X^2 = 6.854, p < 0.012). The hypothesis of the willingness of the household to expand milk production activity positively affects the level of utilization of household in formal credit service.

4.1.1.3   Credit Participation of the Milk Producer

Distance of Formal Credit Service Provider

Distance to the Credit Service: the hypothesis of the distance providing institutions affects the household decision in use of credit service is acceptable in the study area. The mean difference among the participants and non-participants were found to be statistically significant (t= -2.877, p <0.0024). The households are not willing to borrow from formal credit if it is located far away from their home due to the higher transaction cost.

Perception of Household on Credit Service for Milk Production

About 65.0% of sample households perceive that it is important to participant in credit service, and 35.0% did not believe in credit participation. From the credit participant 69.2% households perceived on credit service participation and 30.8% did not. For the non-credit participant households, it was 60.0% and 40.0% in the same order. The mean difference was statistically significant (X^2 = 1.116, p < 0.291). Therefore, the hypothesis of perception is positively influence the level of participation in credit service for milk production acceptable.

Regarding the choice of financial institutions, from the total respondents those preferred microfinance were 36.7%, banks, 26.7%, and both 12.5%. The respondents who did not prefer any one of the financial sector were 24.2%.

There are institutional factors that hinder the participation of households in credit service. In the study area, 44.2% of the sampled households believe that lack of information about the financial sector affect their participation in credit market, 19.2% replied for the high interest rate, and 15.8% of them faced a problem of requirement of high collateral and the bureaucracy of the institutions and 5.0% on return time of loan is short affect their participation decision.

4.1.1.4 Marketing Channels for Information on Credit for Milk Producer

Market Information Provider: Market information increases the market participation of farm households, traders and consumers knowledge of market price, demand and supply information that are vital for market participation decisions. Accordingly, 49.2% of the total sample households indicated that they had access to local market information from cooperative members, 23.3% from persons in the area, 18.3% from retailers, 7.5% from agricultural agent, 0.8% from consumers TV and radio. As per the hypothesis of the actor who provides the market price information is positively related to market participation and marketable surplus, the result indicated that cooperatives played a major role for milk market participation.

Buyer of the Milk Producer: The proportions of buyers were 50.8% by wholesalers, 35.8% by cooperatives, 5.8% by retailers, 4.2% by processors and 3.3% by consumers. This also indicates wholesalers and cooperatives were dominant actors in milk market channel.

4.1.2   Descriptive Result of Cooperatives in the study area

A total of 10 cooperatives named as Eguabu, Central Fitche, Annan obolawn and Bejiga and Gezahegn, Goroharu, Chancho primary, Evanop, Duber, Lelistu who are collecting raw milk from farmers and supply to Selale Dairy Cooperative Union and Elemtu Integrated Milk Industry were interviewed on the purchasing and selling practice in the study area and summarized below:

Purchasing Practice: the cooperatives buy raw milk from farmers and the attractive scheme provided are bulk purchase and transportation facility at collection point.

Selling Practice: all cooperatives supply the raw milk collected from farmers to the milk processors with a margin of profit in credit base.

As per the response of the cooperatives and general observation, the cooperatives did not play expected role the development of milk value chain or did not have a supportive role for the milk producers rather they did an intermediary between producer of milk and milk processors to maximize their own benefit from the selling of the milk.

4.1.3   Descriptive Result of Milk Processors in the Study Area

From the five milk processing industries operating in the study area, two milk processing industries (Selale Dairy Cooperative Union and Elemtu Integrated Milk Industry S.C.) were interviewed on their role of purchasing and selling activities described as follows:

Processing Company

	Selale Dairy Cooperative Union (SDCU):	Elemtu Integrated Milk Industry S.C.
Establishment	January, 2001	January, 2010
Capital	Birr 28 million	Birr 42 million
Capacity	20,000 litter per day in 8 hours	❖ 30,0000 litter per day in 8 hours ❖ Plan to make it 60,000 litters per day in two shifts.
Purchase Practice	❖ **Suppliers of raw milk:** only cooperatives. There are 31 primary dairy cooperative members of SDCU from which 24 of them are supplying milk. ❖ **How to attract suppliers**: SDCU attract suppliers by giving better price, credit service, input and transport facilities for its members.	❖ **Suppliers of raw milk:** both traders and cooperatives who are both members & non-members of Elemtu. There are only 4 cooperatives ❖ **How to attract suppliers:** Elemtu gives only better price to attract the suppliers.
Selling **Practice**	❖ **Products:** Pastoralized and Processed milk products in different forms. ❖ **Market place:** Sell processed milk to retailers at Addis Ababa Market. ❖ **Buyer of products:** 22 retailers & 60 supermarkets and shops ❖ **How to attract byers:** by giving better price, sustainable and quality products.	❖ **Products:** Pastoralized and Processed milk products in different forms ❖ **Market place:** Sell processed milk to retailers at Addis Ababa, Adama and Jima Market ❖ **Byers of products:** Unidentified ❖ **How to attract byers:** by providing quality products.

Source: own survey result (2016)

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The two milk processing assessment indicates that, SDCU which has established mainly by cooperatives gives incentives such as transport service, input and dividends for its members of cooperatives which could distribute for farmers as members of cooperatives. This could be a good experience for integrated milk value chain and could be developed in to value chain financing.

4.1.4 Descriptive Result of Formal Financial Institutions

Financial Institutions: are credit suppliers playing a role as one of the supporters for milk value chain. However, the survey result shows that 30% of the sampled milk producing households were credit users 70% did not use credit service. It is recognized that banks did not give loan for milk producers due to high risk, lack of collateral and considered as small business. On the other hand microfinance institutions provide loan to milk producers as an agribusiness with high interest and through group loan system.

The two financial institutions operating in Sululta area, Cooperative Bank of Oromya and Oromya Saving and Credit Microfinance were interviewed as value chain supporters who believe strongly on the engagement of financial institutions in agricultural value chain financing mentioned below.

Main Components of Making the Business Case for Value Chain Finance:

- ❖ Reduced credit risk through leveraging existing information inside the value chain.
- ❖ Substantially lowers transaction costs in lending and other services.
- ❖ Greater profitability is possible through economies of scale in market transactions and the provision of financial services using value chain connections.

The Basis for Identifying a Target Value Chain are:
- ❖ **Growth in Milk industry,** measured by both the value and volume of production over a specific period of time.
- ❖ **Investment in the Milk industry,** how the market perceives the specific risks and potential of an industry.

- ❖ **Price volatility and changes in production volume,** which provide an indication of operational risks.
- ❖ **Size (measured as the value of production),** can be used to determine the attractiveness of an industry.
- ❖ **Trends in international trade.** These provide an indication of both the potential and the vulnerability of an agri–food industry sector and can offer relevant insight regarding value chain financing.
- ❖ **Financial flows into the industry,** these provide insight into how the financial market views the industry.

Mapping the Value Chain – What Exchanges takes place within a value chain:

- ❖ Identifying and quantifying the flows and relationships that make the provision of inputs, production, processing and distribution possible.

Entry Points for a Financial Institution Implies:

- ❖ Determine the appropriate points to target for financial services
- ❖ The success of a value chain does not imply successful financing unless appropriate partnerships are in place.

Value Chain Financial Products, Tailored to the Specific Needs of the Value Chain and Targeted for financial service:

- ❖ Product-linked financing; leverage
- ❖ Receivables financing;
- ❖ Physical asset collateralization;
- ❖ Risk mitigation products;
- ❖ Structured financing.

Risk Management, Costs and Returns, the value chain approach make agricultural lending feasible through:

❖ Partnering with aggregators in value chain financing creates opportunities for risk and cost sharing.

❖ It is important for financial institutions to perform due diligence and have proper monitoring mechanisms.

❖ When assessing the reliability of aggregators, attributes include: (a) Evidence of a process and capacity to manage the collection and distribution functions within the chain; (b) Access to accurate data and farmer profiles; (c) Stable finances.

❖ Financial institutions pay a commission to the aggregator that performs a number of the credit process functions.

The Changes Necessary in Adapting Bank Structure and Operations, are:

❖ Financial institutions can obtain holistic views of the connections their clients have with other value chain actors.

❖ Monitoring and maintaining clear means of collecting payments are crucial.

❖ Internal bank proposals are prepared based on an evaluation of the value chain as well as client's analyses.

The Questions to be Addressed From Pilot Project to Value Chain Finance Launch,

❖ What information does senior management require for approving the scale-up of a Value Chain Finance pilot?

❖ What information goes into a Value Chain Finance proposal and business plan?

❖ How long does it take a Value Chain Finance project to become 'business as usual'

4.1.5   Descriptive Results of NGOs

The two prominent NGOs (Livestock Market Development, LMD and Netherlands Development Organization, SNV) who are working in Ethiopia on Diary development were communicated to give their opinion on the role of NGOs for the integrated milk value chain financing.

Accordingly, the following identified roles of NGOs are acknowledged by LMD and SNV:

NGOs Can Be Involved In Value Chains Through:

❖ Support smallholder farmers to understand value chains,

❖ Help smallholders build capacity,

❖ Forces government policies, their implementation, monitoring and linkages,

❖ Facilitate arbitration between parties in dispute, NGOs are not supposed to take sides,

❖ Advise the government.

NGOs Role in The Business Environment:

❖ **International arena** – campaigning around international trade rules, ethical initiatives, corporate social responsibility,

❖ **National arena** – advocacy for policies and regulations that support poor producers, create a better investment climate, development and capacity building,

❖ **Local arena** – interventions to influence official attitudes and practices, demonstration projects

NGO's role in Supporting Value-Chain Development:

❖ **Producer Organizations** – work to create / strengthen producer associations and representative organizations that encourage trust and horizontal collaboration,

❖ **Building Linkages & Relationships** – work to create / relationships and business linkages along the value-chain

❖ **Market intermediation** - interventions where NGO's act as a market intermediary – buying and selling on goods

❖ **Upgrading services** – interventions where NGO's take on role of promoting technological change, introducing new techniques, providing training services

NGO's Role in Facilitating Business Services:

❖ **Producer extension services** – support or facilitation of input and service providers serving small-scale producers.

❖ **Value-chain services** – support or facilitation of service providers serving buyers, traders and other intermediary actors in the value-chain.

4.2 Structure, Conduct & Performance of Milk Market in the Study Area

4.2.1 The Major Milk Value Chain Financing Actors

Even if there are different actors involved in milk value chain starting from milk producers to consumers, this study focused on the actors who played major role in milk value chain financing. The actors are grouped in to two, the first group are referred as major value chain financing actors which includes, milk producers, collectors (cooperatives and wholesalers), and processors. The second groups are value chain supporters named as financial institutions and NGOs. The identified value chain actors and supporters are described below;

Milk Producers: are the first major actors in the milk value chain who are predominantly smallholder or largescale farmers who produce milk for home consumption, sale or both. For marketing of their produce they are the one who mostly transport milk for sale to milk collection centers of cooperative/processing company or who sale the milk any place along the main roads.

Collectors: these are the second major actors which includes cooperatives or wholesalers who collect milk from producers and deliver it to milk processing industry.

Processing Industries: These are the third major categories of actors implementing modern technology to process the raw milk in different forms which include pastoralized milk, yogurt, butter and cheese supply to retailers and consumers.

Financial Institutions: providing credit to various actors along the chain to create efficiencies by promoting coordination of a variety of financing services along the chain.

NGOs: non-governmental organizations involved in value chains that play roles in the business environment, market systems and facilitating business services.

4.2.2 Milk Marketing Channels

The milk marketing channels start from producers and integrate different intermediaries up to final consumers. The final users of the product are the consumers in Sululta area and at Addis

Ababa market. The marketing actors along the chain are producers, wholesalers, dairy cooperative, processors, retailers and consumers. The five main different channels identified in the study area and their proportion is indicated figure below:

Fig 4.1: The Main Milk Marketing Channels Identified in the Study Area

No.	Main Milk Marketing Channels	Percentage
1.	Producer → Wholesaler → Retailer → Consumer	21.30
2.	Producer → Wholesaler → Processor → Retailer → Consumer	29.50
3.	Producer → Processors → Retailer → Consumer	4.20
4.	Producer → Processor → Consumer	5.90
5.	Producer → Cooperative → Processor → Retailer → Consumer	35.70
6.	Producer → Consumer	3.30

Source: Own survey result (2016)

4.2.3 Structure of Milk Market

The structure of a marketing system should be evaluated in terms of the degree of market concentration ratio, the condition of entry to and exit from trade and the degree of transparency (Pender et al., 2004). Similarly, in this study area structure of milk market is described using market concentration ratio, the degree of transparency (market information) and barriers to entry and exist conditions (license, educational level, trade experience and seasonality of demand and perishable nature of milk).

4.2.3.1 Market Concentration Ratio

Market concentration refers to the number and relative size of buyers or sellers in the market. Market concentration ratio has been calculated by taking the annually purchased volume of milk by traders in litters, from the main milk market place at Sululta, Chancho, Goro Haro, and Dubar sub-town of the study *kebels*. This concentration ratio can be interpreted as an indicator for the

degree of competitiveness among milk traders. The concentration ratio for milk market was found to be 70.2%. This indicates that the first top five milk traders controlled 70.2% of the purchased of milk marketed at district. According to market structure criteria suggested by Kohls and Uhl (1985), the milk market at the district level has strong oligopolistic market structure.

The top five milk buyers dominating milk market in the study area are Selale Dairy Cooperative Union, Elemtu Milk Processing Industry, Sholla Milk Processor, Sebeta Agro Industry, Loni Milk Processor, and Family Milk Processor each of them has a capacity of processing up to 30,000 liter of milk per day.

According to the explanation given by the LMD professional, the study area has a capacity of producing from 70,000 to 100,000 liter of milk per day but it is only at the areas near to the collection centers that the producers are able to sell. Therefore, the limited purchasers in the limited market area are dominating the milk market.

4.2.3.2 Degree of Market Transparency

The adequate, accurate and timely market information is very essential for producers, traders and consumers in milk marketing decision. Even though, the milk market prices information at local and regional market is required for producers, traders and consumers, the producers lack of sufficient price information especially, terminal market price information.

The result revealed that sources of information were mostly informal, from cooperative members (49.2%), personal observation (23.3%), retailers (18.3%), consumers (8.0%), TV and Radio (8.5%), and agricultural agent (7.51%) (Table 4.3).

Regarding the information on the credit service participation of the milk producers, the result shows that 44.2 % of the respondents did not participate in formal credit service due to lack of information about the financial sector.

Table 4.3: Credit Service Information by Milk Producers
(Percentage of Sample Households)

Source of Information	Percent
Dairy cooperative/ members	49.2
Retailers	18.3
Agricultural Agents	7.5
Consumers	8.0
TV and Radio	8.0
Personal observation	23.3
Total	**100.0**

Source: Survey result (2016)

4.2.3.3 Barriers to Entry and Exit into Milk market

The managerial know-how, licensing, nature of commodity and demand and supply conditions were the barriers to entry in milk market in the study area. Managerial know-how refers to the ability and knowledge of milk traders. It was examined by level of traders' formal education and their trade experiences.

Education: The milk producers survey reveal that about 88.3% of sample milk producers were found to be literate from basic to higher education; while only 11.7% of milk producer household heads were illiterate. The result confirmed that the trader educational background was found to be more important in milk market entry during the survey period.

Experience: Trade experience refers to the number of years that milk producers stayed in the milk trading. The result revealed that about 40.8%, 35.8%, 19.2% and 4.2% milk producers had trade experience of < 1 year, 1-5 years, 5-10 years, and > 10 years, respectively, in raw milk production business. The business experience did not create a barrier to milk market entry.

Licensing of Milk Producers: according to the researcher observation, large number of milk producers did not have license but involved in milk trading in the study area. Thus, trade license did not create market entry barriers at the time of study.

Seasonality of demand and perishable nature of milk: the trader survey result revealed that 80% of the respondents stated that their major milk marketing problem was seasonality of demand associated with highly perishable nature of milk. The informal survey also confirmed that there was highly fluctuating demand associated with perishable nature of milk the traders run out of the trade. The fluctuating demand associated with perishable nature of the milk was found to strong milk market entry and exit barriers.

4.2.4 Conduct on Milk Market

4.2.4.1 Producers Milk Market Conduct

Producers Selling Strategies and Terms of Payment: Milk producer households' accessed to main milk market outlets were cooperatives, wholesaler, retailers and processers. About 50.8% of milk producers sold to wholesalers, 35.8% of farmers sold milk to cooperatives, 5.8% to retailers, 4.2% to processers and 3.3% to consumers in the study area.

The result indicated that among sample market participant respondents, 76.7% have reported that market price is set by buyers, 23.3% reported that price is set by the market. About 99% the respondents reported that the term of payment is conducted on credit basis. And 93.3% of sample households confirmed that they receive money after fifteen days and 5.6% sample households get their money after a week.

Decision factor to whom to sell: The result revealed that the most important factor considered by sample dairy households in decision to whom to sell was price, closeness to milk market center and transport availability and secured demand. Price had greatest influence on the producer's decision to whom to sell (49.4% of the respondent), followed by the closeness to milk market center and transport availability (37.1% of the respondent) and secured demand (13.5% of the respondent) was found to be the third important factor considered by the sample milk producers in deciding to whom to sell milk.

4.2.4.2 Traders Market Conduct

Traders' buying and selling strategies: The supplies of milk in the study area from main sources of milk producer households to milk traders (Cooperative, Wholesaler, Processer, and retailer) are in the form of raw milk. Most of traders receive milk from producers on credit basis and repayment is made after week or fifteen days. Traders buy milk from the producers by themselves and using local milk collectors as commission agents. There is no contractual agreement between market actors and only based on personal relations.

According to the information gathered from both milk producers and traders, the price is mainly set by the buyers. The buyers who give a better price and have a payment schedule in shorter period are preferred by the milk producers.

4.2.5 Performance of Milk Market

Marketing costs and margins: Analysis of the level of marketing margins and their cost components could help to evaluate the impact of the structure and conduct characteristics on market performance. The producers share, marketing margin and cost were considered for analysis of milk market performance in the study area. Marketing costs and margins were used to determine whether there were excess profits and serious inefficiencies or whether there were wide margins or not.

Marketing Costs

Marketing cost of a product refers to all the costs incurred from the point of production up to the final destination for consumers. There were different types of marketing costs of milk trading by each marketing actor; producers, dairy cooperative, wholesalers, processors and retailers. The cost incurred for milk production by dairy household was associated to the utilization of inputs such as feed, labor, veterinary service and others like housing, shelters, etc. The marketing costs incurred by different market actor were costs of processing, transportation, market search, milk spoilage, taxes, and so on. The average price of milk per liter was used for the calculation of marketing costs.

Marketing Margin

The total gross marketing margin (TGMM) was of Channel 1 and 5 was 62.5% and 61.3% respectively, of consumers' price. Among different actors processors obtained the highest gross marketing margin in channel 5 which accounted for 43.5% of consumers' price, followed by retailers in channel 1 which accounted for 42.5% of consumers' price.

In general, producers, share of consumer price was the highest in channel 6 which accounted for 100%, direct purchase to consumers and channel 4 which account 57% (Table 4.4). Generally, processors and retailers have got the highest profit whereas whole sellers and dairy cooperative union has got the least profit.

Table 4.4: Milk Selling Price of Different Channels in the Study Area

Actors		Milk Market Channels					
		1	2	3	4	5	6
Producer	Selling price	7.5	7.5	8.2	8.2	7.1	8.5
	GMMp(%)	38	41	45	57	39	100
Cooperative	Purchase price					7.1	
	Selling price						
	GMMcp(%)					9.2	
Wholesaler	Purchase price	7.5	7.5				
	Selling price	11.5	9.5				
	GMMw(%)	20	10.9				
Retailer	Purchase price	11.5	14.5	14.5		14.5	
	Selling price	20	18.3	18.3		18.3	
	GMMr(%)	42.5	20.9	20.9		20.9	
Processors	Purchase price		9.5	8.2	8.2	9.2	
	Selling price		14.5	14.5	14.5	14.5	
	GMMp(%)		27.3	34.4	43.5	28.9	
Consumer	Purchase price						
	TGGM(%)	62.5	59.1	55.3	43.4	61.3	0.00
	Producers portion (%)	38	41	45	57	39	100

Source: computed as per survey result (2012)

4.3 Econometric Results

Double hurdle model was implemented by using STATA 12 for this study to identify the factors that affect the decision of the household to participate in the formal credit market and those factors that determine the size of credit for milk production and marketing.

The first stage of double hurdle model of this study employed the maximum likelihood estimation of the probit model in order to estimate the parameters of the variables that are likely to influence the credit participation of the household. In the model, 14 explanatory variables were entered and out of them only 5 variables found to be significantly influencing credit participation decision of the household. Variables found to be significant are Education (EDU), Family size (FS), Social role (SR), land size LS), and DIST (distance to formal cash lending institutions).

The second stage double hurdle model used truncated OLS regression model and in which the truncation was made for the way of credit use weather the household used the credit for milk production. In this model 10 variables were entered to determine the factors which are expected to influence the level of cash credit hiring in milk production and marketing and of this variables 4 variables were found significant. Variables found to be statistically significant are AGE, income crop (IC), number of cows (NC), and year of experience (YE).

4.3.1 Determinants of Formal Credit Participation

Education (EDU)

This variable was a categorical variable determined in number of school years. As expected, this variable had a positive relationship with household decision to participate in credit market and it was found to be statistically significant at 5% significant level. The sample household head respondents have maximum education level of higher education and at 5% significance level. The marginal effect of education in credit market participation decision is 0.109 (Table 4.5). The marginal effect of 0.109, other things kept constant, implies the probability of change in credit participation decision is 10.9% for each unit change of educational year. The positive association among the variables implies that for a unitary increase in class year, there will be higher chance for participating in formal credit market.

Family Size (FS):

As expected, this variable was statistically significant at 1% significant level and had a negative effect on the level of credit utilization in milk production and marketing. The negative and significant relationship indicates that household with more number of family members was assumed to consume loan money for other personal needs rather to utilize in apiculture. At 5% significance level; the marginal effect of family size in credit market participation decision is 0.0075 (Table 4.5). The model output shows that for every increase in number of household the level of utilization from loan money to milk production decreases by 7.5%.

Social Role (SR):

This variable was a dummy variable determined in the participation of household in social role. As expected, this variable had a positive relationship with household decision to participate in credit market and it was found to be statistically significant at 5% significant level. The marginal effect of social role in credit market participation decision is 0.168 (Table 4.5). The marginal effect of 0.168, other things kept constant, implies the probability of change in credit participation decision is 16.8% for each social role of household. The positive association among the variables implies that for a social role increase of household, there will be higher chance for participating in formal credit market.

Land Size (LS):

This variable was a categorical variable determined in number of land size in hectares. As expected, this variable had a positive relationship with household decision to participate in credit market and it was found to be statistically significant at 5% significant level. The sample household head respondents have maximum land size of six hectares and at 5% significance level; the marginal effect of land size in credit market participation decision is 0.0701 (Table 4.5). The marginal effect of 0.0701, other things kept constant, implies the probability of change in credit participation decision is 7.01% for each unit change of land size. The positive association among the variables implies that for a unitary increase in land size, there will be higher chance for participating in formal credit market.

DIST (Distance to Formal Cash Lending Institutions):

The results of the model showed that distance of farmers' residences from the nearest financial sector is associated with the participation decision of farmers negatively at 1% significance level. The negative association implies that for a unitary increase in distance between the household residence and the credit market centers, there will be less chance for participating in formal credit market. Farm households with nearby financial sector have a location advantage and use with less transportation cost than those far from the institutions. The marginal effect of this variable indicates that, keeping other variables constant, as distance a farmer travels to formal lending institutions increases by one kilometer the probability of credit market participation decision decreases by 1.25 percent (Table 4.5).

Table 4.5: Results of Probit Regression

Variable	Coefficient	Standard error	Significance level	Marginal effect
SEX	-1.707855	.537149	0.001	-.3947873
AGE	-.0251195	.0192651	0.192	.0058066
EDU	.0472336	.1524228	0.757	-0109185
HFS	.0322535	.0707491	0.648	-0074557
PARSO	-.7283114	.4007145	0.069	.1683562
LHS	.3034215	.1302802	0.020	-.0701388
CPI	.0000507	.0000684	0.459	-.0000117
LH	-.0592899	.0384064	0.123	.0137054
MPE	-.0217236	.0199463	0.276	.0050216
ACAEXS	-1.009738	.4404283	0.022	.2334107
PEMP	-1.656232	.7385856	0.025	.382854
DISTCrS	.0539815	.0674551	0.424	-.0124783
PERCrMP	.340618	.398935	0.393	-.0787372
MCSMINF	-.1284862	.182746	0.482	.0562673
Constant|	-7.119752	2.430273	-11.883	-2.356505

Source: On computation (2016)

4.3.2 Determinants of Credit Milk Value Chain Financing

Age of the Household (AGE)

This continuous variable had a negative relationship with household utilization level of credit money in milk production and it was found to be statistically significant at 1% significance level. The coefficient -21.01 shows that, the changes of level of loan money utilization in milk production and marketing for one year change of age of the household while other variables are kept constant (Table 4.6). The negative and significant relationship indicates that age prohibits the milk production of the household ability to acquire new idea about credit providing institutions and the probability is high of dislike to take loan, which in turn lower the level utilization in milk production and marketing.

Crop Income (CI)

The second stage results of the model indicated that crop income is associated with the level of utilization of households negatively and significantly at 1% significance level. The model output shows that; the level of hiring from loan money to milk production and marketing decreases in 1.16 for one more Birr increases of crop income (Table 4.6). This is because the household meets its input demand from income obtained from crop sold.

Number of Cows (NC)

The second stage results of the model indicated that number of cows is associated with the level of utilization of households negatively and significantly at 1% significance level. The model output shows that; the level of hiring from loan money to milk production and marketing increases in 62.71 for one more one increases of cow (Table 4.6). This is because the household meets its input demand from income obtained from livestock sold.

Year of Experience (YE)

The second stage double hurdle model supported that household milk production experience had negative and significant impact in level of participation at citrus paribus. The analysis shows that the level of utilizing from cash of milk production and marketing increased by 28.43 unit when the households had one more higher experience in milk production (Table 4.6). This is because

the household purchase inputs from previous money of milk production experience which implies it had a systematic association with the level of utilization in to the milk production and marketing at 5% significance level.

Table 4.6: Result of Truncated OLS Regression

Variable	Coefficient	Standard error	Significance
AGE	-21.00602	197.5987	0.915
EDU	4103.45	2276.074	0.071
HFS	-201.7437	861.1201	0.815
PARSO	-640.8562	4566.6	0.888
LHS	11.09105	1605.795	0.994
CPI	-1.155828	.9498462	0.224
LH	62.71321	328.8148	0.849
MPE	28.43021	168.4746	0.866
ACAEXS	-10113.64	5415.912	0.062
PEMP	-3593.146	5811.462	0.536
DISTCrS	2517.741	941.0232	0.007
Cons	7463.904	27066.21	0.783
/sigma | 9902.563 1686.061 5.87 0.000 6597.943 13207.18			

Source: own computation (2016)

Summary of Research Investigation/ Findings of the Research

This study has analyzed the integrated milk value chain financing with a particular focus on the case of Sululta Area, Oromia Special Zone Surrounding Addis Ababa, Ethiopia. The specific objectives of the study were to identify the key milk marketing channels, assess structure, conduct and performance of milk market and identify factors affecting credit market participation decision. Accordingly, the major findings of this study are summarized as follows:

Socioeconomic Variables: were tested for the presence of significant mean difference among credit participants and non-participants. The mean difference among the credit participants and non-participants were found to be statistically significant for the household age, education level, crop income, and total livestock unit, distance to credit providing agencies and access to both agriculture and credit extension services.

Market Conduct of the Study Area: indicated that, about 50.8% of milk producers sold to wholesalers, 35.8% of farmers sold milk to cooperatives, 5.8% to retailers, 4.2% to processers and 3.3% to consumers in the area. 76.7% of the sampled market participant respondents have reported that market price is set by buyers, 23.3% reported replied that price is set by the market. About 99% the respondents reported that the term of payment is conducted on credit basis. And 93.3% of sample households confirmed that they receive money after fifteen days and 5.6% sample households get their money after a week.

Milk Market Chain Analyses: of the study area revealed that, existence of six main alternative milk market channels in the study area. The structure of the market was analyzed by taking the share of the four large firms from the total volume of milk trade by the sampling traders. The concentration ratio indicated that the first top five milk traders have controlled 70.2% of the total volume of milk purchased. Thus, the structure of the milk market in the study area was strong oligopolistic market structure dominated by few firms.

The total gross marketing margin (TGMM) was highest in channel 1 and 5 which was 62.5% and 61.3% respectively. Processors have got the highest gross marketing margin whereas wholesalers have got the lowest marketing margin. The net marketing margin of the retailers and processors

was highest in channel-5 that was 43.5% followed by retailers in channel-1 which was 42.5% of consumer's price. Producer's share (GMMp) was highest in channel- 6 and Channel-4 which was about 100% and 57%, respectively from the total consumers' price.

Micro finance institutions are the major supplier of the cash credit money which supplied to 95.9% of the sampled households. The major challenges of the household not too well participate in credit service are lack of information to the credit providing agencies, their access to the credit, the bureaucracy of the institutions and distance to the lending institutions. Farmers' perception about the importance of employing loan money for milk production and marketing perfectly increases the use of part or all of loan money for milk production. About 45.4% of the credit participant sample households perceive that as it is important to the milk production and marketing. From these perceivers no one had invested anything on it.

The result of first stage double hurdle model reveals smallholder farmers decision to participate in credit market is significantly explained by distance to lending institutions, education level, access to extension services in relation to credit use and total livestock unit the household owns.

The second stage of double hurdle model shows that total crop income, former credit use experience, age of the household head, interest to expand milk production and non-farm income was significantly affects the level of loan money utilized for honey production and marketing.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

On the basis of the results of this study, the conclusion drawn aimed at promoting milk value chain through integrated chain supporters (formal financial institutions) in providing credit to empower milk producer households are the following.

The socioeconomic factors for credit service participation of the milk producers found positive effect in the study area based on the sampled data were, sex of the majority respondents were males who are more exposed for credit service, the age who were found to be in the young group are also risk takers for credit service. With regard to education, most of the respondents had at least basic education which helps for exposure of credit service. Distance to the lending institution negatively and significantly affects their participation decision.

The market conduct in the study area revealed that, price of milk is set by the buyers and therefore, milk producers sell their milk for wholesalers who provide better price and the payment in short period than cooperatives who pay in credit base and payment in longer period.

The channel that passes through the producers and cooperatives is more beneficial to producers because good information flow among them and also they are the main collectors of the milk from the producers with a mechanism of creating collection center and providing transport service.

Regarding the concertation of the market it was found oligopolistic that few traders controlled the milk market by purchasing large volume up to 70 %. Therefore, milk producers are price takers set by these traders.

Lack of information, bureaucracy, distance were identified as the challenges for the milk producers to participate in credit service.

5.2 Recommendations

Extend a Loan to Union Through Processors, Banks' Reputable Customers.

The limited financing philosophy of commercial banks needs to be examined. They need to look beyond the business oriented credit worthy customers. It is important to look further and ensure that the value chain where their customers are operating is sufficiently financed and operating smoothly. It is recommended that commercial banks to extend a loan to Union through processors, banks' reputable customers. The Bank provide the loan to the Union, the Union repays the loan in the form of milk and milk products to the processor. The processor withholds the loan repayment amount from the milk products value and pay back to the bank. The bank minimized the risk of repayment by dealing with group customers and extending its credit services to wider scope in the value chain.

It is a win-win situation at all level. Under this proposal, processors will benefit from having a reliable and financially strong Union. The Union will get a loan without physical collateral. The commercial banks increased their outreach at a lower cost. The Union needs to demonstrate organizational competence and good governance.

Value Chain Financing with the Involvement of Commercial Banks, MFIs, Cooperatives and Farmers

It is recommended that the MFIs and commercial banks to work together using the established chain relationship between the farmers and the cooperatives. Commercial Banks extend loan to MFIs and MFIs extend loans to farmers, cooperatives withhold the loan repayment from the milk payment and repay to the MFI, MFI then settle their loan to commercial banks. This proposal will work if commercial banks revise their years old collateral based financing, at least when they are dealing with reputable MFIs. If collateral remain a concern, international banks, organizations and Regional Governments are options for loan guarantee. As indicated in the various part of this study, value chain financing is beyond sector financing. It is all about the

efficiency of the whole value chain. In recent past, government was granting collateral guarantee for loans taken by cooperatives and unions.

The experience of other countries mentioned in the empirical review of this study on the role of cooperatives who are the intermediators for value chain financing who are able to get easily the diversified farmers and provide large volume of milk to processors. The Korean, Indian and Kenyan successful experience are recommended as they could be implemented for our country with the necessary customization, mainly by the government involvement and commitment for the development of diary sector.

In order to develop the sense of partnership among all market actors along the value chain especially to improve the flow of information among them sharing one channel experience and engaging in discussions with stakeholders on how to improve the system could be better. The channel that passes through the producers and cooperatives is more beneficial to producers because it have seen that good information flow among them and also there is supply of input that is transport facility so it increased the producers' margin and their value adding activities. So it will be better if to share their experience to the other channels.

Improving The Single Borrower Limit: Based on the research findings, the lower level of dairy value chain is a missed sector for financers as it swings in the middle of MFIs and commercial banks due to their policy of considering agriculture as risk business and collateral base loan. Therefore, upgrading of MFIs' single borrowing limit is a paramount importance to address the financing gap of actors in the dairy sector especially those at the lower level of the chain. This is achieved through increasing of the capital of the respective MFI, and lifting of a self-imposed (internal policy of the MFIs) limits.

Building a collateral base: It is recommended that cooperatives and the Union to build their fixed asset base to enhance their collateral capability. This can be achieved through reducing the distributable profit of both the cooperatives and the Union. Further study should to be taken in the analysis of the impact of credit market participation on different value adding activities of the producers.

Sustainable management: Cooperatives and the Union have to demonstrate their sustainable institutionalized business management to a level where financiers could depend on working with them and entering into a long term commitment.

Non-financing Issues: It is recommended to address other challenges of the value chain, especially the marketing components through coordinated efforts by various stake holders. Demand development, quality improvement, enforcement of standards, a national body specifically concerned for dairy, like the Kenyan and Indian dairy board are recommended course of actions.

Formal credit providers as chain supporting institutions should to consider the milk value chain actors by minimizing the barriers in order to attract small scaled producers to the institution by linking them with the cooperatives who could play an intermediary role among producers, processors and financial institutions.

Further study should to be taken in the analysis of the impact of credit market participation on different value adding activities of the producers.

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APPENDICES

Appendix Table 1: Probit Model Regression

```
Ordered probit regression                    Number of obs    =        120
                                             LR chi2(17)      =      66.64
                                             Prob > chi2      =     0.0000
Log likelihood = -49.442755                  Pseudo R2        =     0.4026
```

Creditparticipation	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Sex	-1.707855	.537149	-3.18	0.001	-2.760648	-.6550623
Age	-.0251195	.0192651	-1.30	0.192	-.0628784	.0126394
Education	.0472336	.1524228	0.31	0.757	-.2515095	.3459768
Familysize	.0322535	.0707491	0.46	0.648	-.1064122	.1709191
Socialrole	-.7283114	.4007145	-1.82	0.069	-1.513697	.0570746
Hectarofland2	.3034215	.1302802	2.33	0.020	.048077	.558766
Incomecrop	.0000507	.0000684	0.74	0.459	-.0000835	.0001848
Numbercows	-.0592899	.0384064	-1.54	0.123	-.134565	.0159853
Yearofexperience	-.0217236	.0199463	-1.09	0.276	-.0608176	.0173704
Extensionservice	-1.009738	.4404283	-2.29	0.022	-1.872961	-.1465139
expansionplan	-1.656232	.7385856	-2.24	0.025	-3.103833	-.2086304
Beliveoncredit	.340618	.398935	0.85	0.393	-.4412802	1.122516
Distanceofcreditservice	.0539815	.0674551	0.80	0.424	-.078228	.186191
Problemsofcreditservice	-.3046846	.0940569	-3.24	0.001	-.4890327	-.1203366
Trainingbyformalcreditprovider	.454416	.4110959	1.11	0.269	-.3513171	1.260149
Bayerofmilk	-.1284862	.182746	-0.70	0.482	-.4866619	.2296895
Sourceofcreditservice	-.2434132	.1693979	-1.44	0.151	-.5754269	.0886005
/cut1	-7.119752	2.430273			-11.883	-2.356505

Note: 1 observation completely determined. Standard errors questionable.

Appendix Table 2: Marginal Effects Regression

```
Average marginal effects                        Number of obs   =        120
Model VCE    : OIM

Expression   : Pr(Creditparticipation==1), predict()
dy/dx w.r.t. : Sex Age Education Familysize Socialrole Hectarofland2 Incomecrop Numbercows Yearofe:
               Beliveoncredit Distanceofcreditservice Problemsofcreditservice Trainingbyformalcred:
               Sourceofcreditservice
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf. Interval]	
Sex	.3947873	.1084402	3.64	0.000	.1822483	.6073262
Age	.0058066	.004387	1.32	0.186	-.0027917	.0144049
Education	-.0109185	.0351525	-0.31	0.756	-.0798162	.0579792
Familysize	-.0074557	.0163509	-0.46	0.648	-.039503	.0245916
Socialrole	.1683562	.089006	1.89	0.059	-.0060923	.3428048
Hectarofland2	-.0701388	.0283082	-2.48	0.013	-.1256219	-.0146557
Incomecrop	-.0000117	.0000157	-0.75	0.456	-.0000425	.0000191
Numbercows	.0137054	.0085583	1.60	0.109	-.0030685	.0304793
Yearofexperience	.0050216	.0045406	1.11	0.269	-.0038778	.0139211
Extensionservice	.2334107	.0966374	2.42	0.016	.0440048	.4228165
expansionplan	.382854	.1620082	2.36	0.018	.0653237	.7003843
Beliveoncredit	-.0787372	.0911896	-0.86	0.388	-.2574655	.0999911
Distanceofcreditservice	-.0124783	.0153984	-0.81	0.418	-.0426586	.0177019
Problemsofcreditservice	.0704308	.0183545	3.84	0.000	.0344567	.106405
Trainingbyformalcreditprovider	-.1050427	.0939557	-1.12	0.264	-.2891925	.0791072
Bayerofmilk	.0297008	.0419113	0.71	0.479	-.0524438	.1118455
Sourceofcreditservice	.0562673	.0382853	1.47	0.142	-.0187704	.1313051

Appendix Table 3: Truncated Result

```
Truncated regression
Limit:   lower =          0                   Number of obs =      65
         upper =       +inf                   Wald chi2(17) =  15.10
Log likelihood = -654.58034                   Prob > chi2   = 0.5880
```

Levelofcredit	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Sex	-5090.054	4780.224	-1.06	0.287	-14459.12	4279.012
Age	-21.00602	197.5987	-0.11	0.915	-408.2923	366.2803
Education	4103.45	2276.074	1.80	0.071	-357.5741	8564.473
Familysize	-201.7437	861.1201	-0.23	0.815	-1889.508	1486.021
Socialrole	-640.8562	4566.6	-0.14	0.888	-9591.229	8309.516
Hectarofland2	11.09105	1605.795	0.01	0.994	-3136.21	3158.392
Incomecrop	-1.155828	.9498462	-1.22	0.224	-3.017492	.7058366
Numbercows	62.71321	328.8148	0.19	0.849	-581.7519	707.1783
Yearofexperience	28.43021	168.4746	0.17	0.866	-301.7739	358.6343
Extensionservice	-10113.64	5415.912	-1.87	0.062	-20728.64	501.3501
expansionplan	-3593.146	5811.462	-0.62	0.536	-14983.4	7797.111
Beliveoncredit	-8055.912	5062.26	-1.59	0.112	-17977.76	1865.936
Distanceofcreditservice	2517.741	941.0232	2.68	0.007	673.3697	4362.113
Problemsofcreditservice	-243.0632	1283.631	-0.19	0.850	-2758.934	2272.807
Trainingbyformalcreditprovider	5811.963	4755.916	1.22	0.222	-3509.461	15133.39
Bayerofmilk	1768.388	2060.937	0.86	0.391	-2270.975	5807.751
Sourceofcreditservice	383.7075	1931.588	0.20	0.843	-3402.135	4169.55
_cons	7463.904	27066.21	0.28	0.783	-45584.89	60512.7
/sigma	9902.563	1686.061	5.87	0.000	6597.943	13207.18

QUESTIONNAIRE

ASSESSMET OF INTEGRATED MILK VALUE CHAIN FINANCING IN ETHIOPIA: THE CASE OF SULULTA AREA DAIRY VALUE CHAIN

Questionnaire for Raw Milk Producers

Remark: The objective of this questionnaire is to obtain the primary information on the factors affecting the milk value chain finance through integration of the main actors (Farmers, Cooperatives, Milk Processer, NGOs and Microfinance Institution)..For the validity of this research your genuine response is kindly requested. I would like to thank you in advance for your cooperation.

Direction: the multiple choice and open ended questions are designed to gather the information. Please answer the questions freely and honestly by circling (O)onthe multiple questions answer categories you choose and putting the figure or description for open ended under each question.

Name of Milk Producer_____;

Address, Region:_____Zone:_____Woreda:_____Kebele : _____Telephone _____

1. Household Information	Categorical
Sex of the respondent	1) Male 2) Female
Age of the respondent (years)	1) 18 – 30 2) 31 – 45 3) 46 – 60 4) > 60
Level of education	1) Illiterate 2) Basic education 3) Primary school 4)Secondary School 5)Higher education
Marital status	1) Married 2)Single 3)Divorced 4) Living together 5)Widow /Widower
Family size including house hold	1) < 5 2) 5 to 10 3) > 10
Are you involved or participated in any social role or position in the community?	1) Yes 2) No

Do you have your own land?	1) Yes 2) No
If yes how many hectares of land do you have?	1) No Land 2) 1 Hectare 3) 1 to 5 Hectare 4) 5 to 10 Hectare 5) > 10 Hectare
Do you cultivate crops?	1) Yes 2) No
Please specify the amount of income earned from major crops	1) No crop income 2) Birr 1,000 to Birr 5,000 2) Birr 5,000 to Birr 20,000 4) > Birr 20,000
2. Milk Production Issues	
How many Local and Crossbreed milking cows do you have?	1) < 5 Local and Crossbreed 2) 5 to 10 Local and Crossbreed 3) 10 to 20 Local and Crossbreed 4) > 20 Local and Crossbreed
What is your milking cow 'average daily milk yield (in liter)?	1) <5 Liter 2) 5 to 10 Liter 3) 10 to 20 Liter 4) > 20 Liter
How long you have been engaged in milk production? (in years)	1) < 1 Year 2) 1 to 5 Years 3) 5 to 10 Years 4) > 10 Years
Why do you engage in milk production?	1) For home consumption 2) For sale 3) Both 4) Others (specify) _____
Did you have access extension service in relation to livestock	1) Yes 2) No
If yes, what type of extension services did you get? in relation to livestock and milk production.	1) Livestock production and management 2) Dairy production and Milking 4) Livestock health 5) Artificial insemination 6) No Extension Service given
Who is the supplier of extension service and training for the household?	1) Woreda agricultural office 2) Cooperatives 3) Market 4) NGOs 5) No one
Do you want to expand your milk production?	1) Yes 2) No
If your answer is **yes** for the above question what activities have you done to expand the system?	1) Purchasing milk cow 2) Purchasing animals feed 3) Purchase milk can 4) Breeding by artificial insemination what the farmer have 5) None
What was your source of finance to purchase the inputs for milk production?	1) Income from livestock 2) Income from crop 3) Gift from relatives and friends 4) Credit from relatives and friends 5) Credit from formal lending institutions
3. Credit Participation	
Did you participate in credit service?	1) Yes 2) No

Did you believe that participating in credit system has a positive impact on milk production and marketing?	1) Yes 2) No
If your answer for the above question is yes how you get the credit?	1) In cash 2) In kind 3) both
If **in cash** for question number **2** from whom you get the service?	1) Microfinance 2) Bank 3) Both 4)Others_____
How long it could be the distance to the nearest lending institution?	1) <1 km 2) 1km to 5km 3) 5km to 10km 4) >10km 5) Not Applicable
What is your source of information about credit providers?	1) Cooperatives members 2) Agricultural Agents 3) Retailers 4) Consumers 5) TV and Radio 6) Personal information
What are the problems you faced from formal lending institutions?	1) Lack of information about the institutions 2) Distance from lending institution 3) Requirement of high collateral 4) High interest rate 5) Return time of money borrowed 6) Bureaucracy of the institutions 7) Others specify _____
What is the problem for returning the borrowed money?	1) The profit not exceeds the cost 2) Not informed when and how to return 3) Lack of awareness about the credit system service 4) No Sustainable Market
Have you been attended any formal credit related training program?	1)Yes 2) No
4. Marketing Channels	
Where do you sell your milk?	1) At the Farm place 2) At Collection point of Sululta market 3) At Addis Ababa market
To whom did you sell milk	1) Cooperatives 2) Wholesalers 3) Retailers 4) Processors 5) Consumers 6) others_____
Who is your source of information about price?	1) Farmer traders 2) Cooperative 3) Retailers 4) Agricultural Agent 5) Myself 6) Processor 7)TV and Radio
Who gives you an information and recommendation how to modify your production and market supply system?	1) Extension agents 2) TV and Radio 3) Friends 4) Cooperatives 5) No one 6) processor

Questionnaire for Cooperatives'

Remark: The objective of this questionnaire is to obtain the primary information on the factors affecting the milk value chain finance through integration of the main actors (Farmers, Cooperatives, Milk Processer, NGOs and Microfinance Institution).. For the validity of this research your genuine response is kindly requested. I would like to thank you in advance for your cooperation.

Direction: the multiple choice and open ended questions are designed to gather the information. Please answer the questions freely and honestly by circling (O)on the multiple questions answer categories you choose and putting the figure or description for open ended under each question.

Name of the Cooperative_____;

Address, Region:_____Zone:_____Woreda:_____Kebele : _____ Telephone _____

General Information	Categorical
Total Member of the cooperative	1) < 20 2) 21- 50 3)51 -100 4)>100
Age of the cooperative	1) < 5 years2) 6 – 10 years 3) 11 – 25years 4) >25years
Purchase Practice	
How did you buy milk and milk products	1) from farmer 2) from market
If buy from farmer how many regular farmer suppliers do you have?	
How the milk is supplied to you	1) Raw milk without processing 2) Processed milk 3) other specify
How did you attract your suppliers for a better relationship	1) By giving better price 2) Giving credit service 3) By supplying input 4) Others _____.
Selling Practices	
To whom you sell your milk product	1) Processors 2) Wholesalers 3) Retailers 4) Consumers

To which market you sell the product	1) Sululta, 2)Addis Ababa 3)Both 4) Others_____
How many regular buyers do you have	1) Processors _____ 2) Wholesalers____ 3) Retailers _____ 4) consumers_____
How you sell milk to your buyer	1) Raw milk without processing 2) Milk after processing manually 3) Milk after processing by machine 4) Other_____
How did you attract your buyers?	1) By giving better price 2) By credit sell 4) By visiting them 5) Others _____
Is there any activities your buyers did for a better relationship	1) Giving credit service 2) supplying input 3) giving transport service 4) other _____

Questionnaire for Milk Processor

Remark: The objective of this questionnaire is to obtain the primary information on the factors affecting the milk value chain finance through integration of the main actors (Farmers, Cooperatives, Milk Processer, NGOs and Microfinance Institution). For the validity of this research your genuine response is kindly requested. I would like to thank you in advance for your cooperation.

Direction: the multiple choice and open ended questions are designed to gather the information. Please answer the questions freely and honestly by circling (O) on the multiple questions answer categories you choose and putting the figure or description for open ended under each question.

Name of the Processor_____;

Address, Region:_____Zone:_____Woreda:_____Kebele : _____ Telephone _____

1. General Information	
Age of the processor (year of establishment)	1) < 5 years 2) 6 – 10 years 3) 11 – 25 years 4) > 25 years
Capacity of the processor in liters per day	1) < 5,000 liter 2) 5,001 - 10,000 liter 3) 10,001-30,000 liter 4)> 30,000 liter
2. Purchase Practice	
From whom did you buy milk and milk products	1) from farmers 2) from cooperatives
If buy from cooperatives how many regular cooperatives suppliers do you have?	
How the milk is supplied to you	1) Raw milk without processing 2) Processed milk 3) other specify
How did you attract your suppliers for a better relationship	1) By giving better price 2) Giving credit service 3) By supplying input 4) Others _____.
3. Selling Practices	
To whom you sell your milk product	1) Processors 2) Wholesalers 3) Retailers 4) Consumers
To which market you sell the product	1) Sululta, 2)Addis Ababa 3)Both 4) Others_____
How many regular buyers do you have	1) Processors _____ 2) Wholesalers____ 3) Retailers _____ 4) consumers_____
How you sell milk to your buyer	1) Raw milk without processing 2) Milk after processing manually 3) Milk after processing by machine 4) Other_____
How did you attract your buyers?	1) By giving better price 2) By credit sell 3) by visiting them 5)Others_____
Is there any activities your buyers did for a better relationship	1) Giving credit service 2) supplying input 3) giving transport service 4) other _____