

**INSTITUTIONAL ANALYSIS OF DAIRY MARKETING: THE CASE
OF BAHIR DAR MILK SHED AREA**

MSc THESIS

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DEDICATION

Dedicated to my beloved families: My wife Abeba Gebrehanna, and my son Kaleab Mesfin.

STATEMENT OF THE AUTHOR

By my signature below, I declare and affirm that this Thesis is my own work. I have followed all ethical and technical principles of scholarship in the preparation, data collection, data analysis and compilation of this Thesis. Any scholarly matter that is included in the Thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every serious effort has been made to avoid any plagiarism in the preparation of this Thesis.

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BIOGRAPHIC SKETCH

The author, Mesfin Bahta Tesfay, was born in Gulomekada district in Eastern Zone of Tigray National Regional State on June 13, 1972. He attended his primary education (1-4 grades) in Biro Elementary School in Kilat kebele. The author then went to Massawa town and attended his junior education (from 5-6 grades in Sheikh Alamin Elementary School, from 7-8 grades in Amatere Junior School, and from 9-10 grades in Semhar Senior Secondary School). He completed his Second Semester class of grade 10 in Assab Secondary School in Assab Town. He then completed his secondary education (grade 11 and 12) in Entoto Academic, Technical and Vocational School in Addis Ababa.

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LIST OF ACRONYMS

ACDI/VOCA	Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance
AGP	Agricultural Growth Project
ANRS	Amhara National Regional State
CSA	Central Statistical Agency
EEA	Ethiopian Economic Association
FAFFD	Finnish Agency for Food and Forest Development
ILRI	International Livestock Research Institute
LMD	Livestock Market Development
LPA	Livestock Promotion Agency
MoA	Ministry of Agriculture
NBE	National Bank of Ethiopia
NIE	New Institutional Economics
OIE	Old Institutional Economics
TCE	Transaction Cost Economics
VIF	Variance Inflation Factor
WoARD	Woreda office of Agriculture and Rural Development

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INSTITUTIONAL ANALYSIS OF DAIRY MARKETING: THE CASE OF BAHIR DAR MILK SHED AREA

ABSTRACT

As market exchange increases, there should be institutional set-ups that facilitate transaction of products especially products like milk and milk products that need immediate exchange due to their nature of being easily exposed to spoilage. Despite this importance of institutional environments and arrangements in dairy marketing, studies focusing on institutional analysis of dairy marketing have not been done in the study area. Thus, the study was conducted in Bahir Dar milk shed area in West Gojam of the ANRS aiming at analyzing the institutional environments and arrangements in dairy marketing. Three sample districts namely Bahir Dar Zuria, Bahir Dar City and Mecha districts were selected with two kebeles per each hence a total of six kebeles for the study purpose. Multistage sampling technique was used for the study. In the 1st stage, three districts within Bahir Dar Milk Shed area were selected purposively based on their milk production potential. Based on this, Bahir Dar Zuria, Bahir Dar City, and Mecha districts were selected for the study purpose. In the 2nd stage, 2 kebeles were randomly selected from the purposely selected potential kebeles in each district and a total of 6 kebeles were selected. In the 3rd stage, households who have dairy cows were listed from each kebele and were randomly and proportionally selected for the study. A total of 160 dairy producers, 30 traders, 27 consumers, 20 cafes/restaurants/ hotels, 3 milk cooperatives, and 3 private milk processors were used for the study purpose. In addition to these, discussions were also made with dairy producers and trader focus groups, organizations/institutions, and key informants. Both primary and secondary data were used for the study. Primary data was collected directly from dairy cow producer households, milk and butter traders, milk cooperatives, private milk processors, cafes/restaurants/ hotels, and individual consumers. Data was also collected from key informants and focus group discussions. Secondary data was collected from different organizations and published and unpublished documents. Descriptive statistics, and econometric methods including, Heckman two-stage, Probit Model and Multinomial Logit Models (MNL) were used to analyze the data. In the first step of Heckman two-stage, Milk Market Participation (MMP) of dairy producers was estimated. Among the fourteen explanatory variables used, price of milk in kebele, access of the respondent to marketing information, total land holding size, and membership to dairy cooperatives positively and significantly affected the milk marketing participation of the dairy producers whereas sex of the respondent negatively and significantly affected the MMP decision. Determinants of volume of milk marketed (VMM) was estimated in the Second-Stage Heckman selection estimation procedure and education level of the household head, experience in dairy farming, and livestock size excluding dairy cows affected positively and significantly the VMM whereas sex of the respondent, household size, total land holding size and access to credit affected negatively and significantly the VMM. In the Contract or Non-Contract (CONC) use of dairy producers for selling milk using Probit model, experience in dairy farming and membership to milk cooperative affected positively and significantly whereas non/off farm income and access to credit affected negatively and significantly the CONC use of the dairy producers. Probability of default in contractual agreement was estimated using Probit model and experience in dairy farming, price of milk in kebele and contact with livestock extension agent positively

affected the probability of default whereas sex of the respondent, volume of milk marketed, membership to other collective action group, and access to credit negatively affected the probability of default in contractual agreement. Among the explanatory variables used in the formal, informal, or non-contractual arrangement (FINC) choice decisions using MNL model, two variables affected the choice of formal agreement and two variables affected the choice of informal agreement while two variable affected both formal and informal contractual agreements as compared to the non-contract which was used as the base category. In the Milk Market Outlet Choices at point of first sale, MNL model estimated that one variable was found to affect the choice for consumers and two variables affected the choice for dairy cooperatives/milk processors while two variables affected both choices for consumers and dairy cooperatives/milk processors as compared to the other market which was used as the base category. The study has also revealed that due to lack and weak functioning of formal institutions, the informal institution, that is, trust was found to be dominant in the dairy marketing in the study area. Moreover, the study has revealed that there were weak linkages among the different actors in milk marketing. It was also found that among the transaction costs, the transaction cost related with searching trading partners, screening trading partners and searching price information were the highest both for dairy producers and traders indicating the lack of market linkages. Institutional, production and marketing challenges for dairy marketing were identified in the study area among them absence or shortage of legal enforcement mechanisms, cultural/religious influence, incomplete property rights on land, lack of standard quality and weighting measures, shortage of feed and improved dairy cross breed cows, shortage of grazing lands, lack of market linkages, market/demand and price uncertainty, and shortage of milk processing plants/milk cooperatives were the major ones. Expansion of infrastructures; availability of dry fodders and expansion of flour factories; and increasing urban population are among the opportunities in dairy marketing. Thus, besides focusing on important significant variables in the econometric model results, policy makers should focus on devising appropriate dairy marketing policies, regulations, and rules. In addition to this, efforts should be given to improve the market linkages in the study area.

Key words: institution, dairy marketing, probit, multinomial logit

1. INTRODUCTION

1.1 Background of the Study

Agriculture is the largest sector in many developing countries in terms of their share in Gross Domestic Product (GDP) and employment (Fan *et al.*, 2008). Ethiopia, with a total area of about 1.1 million square kilometers (Central Statistical Authority-CSA, 2012), and a population of about 94 million people, is an agrarian country on which its economy is mainly based on agriculture including crop and livestock production. Agriculture is the largest contributor to the overall economic growth and is a crucial for the country's food security by reducing poverty. The agriculture sector accounts for 38.8 % of national GDP (National Bank of Ethiopia-NBE, 2015). The sector also contributes about 80% of foreign export earning, and provides about 73% of employment opportunities (Agricultural Transformation Agency-ATA, 2014). The agricultural sector is dominated by smallholders and largely subsistence farming which is characterized by low productivity and fragmented and highly degraded lands.

Ethiopia is endowed with large and diverse livestock resources. Based on the Agricultural sample survey conducted by the CSA (2012/13), there are about 53.99 million cattle, 25.5 million sheep, 24.06 million goats, 6.75 million donkeys, 1.91 million horses, 0.35 million mules, 0.92 million camels, 50.38 million poultry, and 5.21 million hives in the rural sedentary areas of the country (Excluding large scale dairy farms, fattening owned by investors, cooperatives and other institutions, and urban area livestock numbers). With the huge number of livestock resources, Ethiopia is believed to be home for the largest livestock population in Africa and the tenth in the world (CSA, 2013).

Despite these huge amount of livestock the country owns, it is not benefited from these resources due to many reasons in which inadequate resources, lack of suitable institutions, technological problems, and inappropriate development policies are among the major factors for the poor performance of the sector (Aleme and Lemma, 2015). According to Ethiopian Economic Association (EEA, 2015), livestock contributed only 21% to the agricultural GDP and less than 10% to the total GDP in 2013/14 agricultural year. The contribution of the livestock industry to the country's total exports currently is also low compared to its potential due to many reasons. Underdevelopment and lack of market oriented production, lack of adequate information on livestock resources, inadequate

permanent animal route and other facilities like water and holding grounds, lack of provision of transport, inadequate infrastructural and institutional set-ups, prevalence of diseases, illegal trade and inadequate market information are some of the major reasons that contribute for the poor performance of the sector (Belachew and Jemberu, 2002). The growth rate of the sector is also very less as compared to the crop sector. For instance, in the production year 2013/14, the livestock sector grew only by 2.1% while the crop sector grew by 6.6% (NBE, 2014).

Dairy production is among livestock benefits that provide milk and milk products both to producers and consumers in rural and urban areas. Ethiopia has a large potential for dairy development because of its large livestock population and favorable climate for improved, high yielding breeds. However, milk productivity in Ethiopia is low due to many reasons. The dairy sub-sector is characterized with low production and productivity of both milk and milk products. The average daily milk productivity, for instance, for Ethiopia is 1.35 liters for local cow. The country produced 3.3 billion liters of milk in 2011/12, which have worth of \$1.2 billion and imported an additional worth of \$10.6 million of dairy products (FAO, 2011). The total cow milk production for the rural sedentary areas of the country during 2013/14 was close to 3.07 billion liters (CSA, 2014). This production is very low compared to 11 million milking cows exist in the country.

The problem is not only the low productivity of milk but also the institutional set-up in dairy marketing that can assist and facilitate in achieving market performance in milk producing areas. The production and marketing of milk and milk products require more and more information flows and institutional arrangements among various supply chain stages due to its nature of complex with both formal and informal channels.

Smallholder farmers especially when they are situated in remote areas often faced with difficulties in enforcing contracts and meeting severe food safety norms, and lack skills. Due to this, they rely on middlemen. The problem lies not only on the power imbalance in the participation along the value chain by the producers and traders only, but the problem is also on the poor physical infrastructures, weak institutional facilitations or linkages in milk markets (Kherallah and Kirsten, 2001). Technological development alone is unlikely to bring market opportunities unless it is supported by proper institutional innovations that facilitate market development and address other constraints along the dairy market. Institutions, through institutional arrangements or contractual agreements and collective

action (like milk cooperatives) can help farmers to coordinate productions and marketing decisions, reduce transaction costs and enhance bargaining power. Institutional linkages among different actors in the dairy sector can facilitate healthy supply of milk and milk products from producers to consumers with benefiting all actors (Jari and Fraser, 2014).

Good market infrastructures and institutional set-ups improve the access of producers to potential markets where they can supply more volumes with higher share to the end market price. Institutional quality such as property rights, contract enforcement and rule of law are important factors that help producers to participate in productive activities and get the benefit of their products. Institutions are good for integration due to their effect on trade cost and by creating openness and transparency (Elias, 2011).

Dairy producers are challenged by many hidden costs that make it difficult for them to gain access to markets and productive assets. Among the barriers which may be influenced by policy include the transaction costs associated with arranging and carrying out an exchange of goods or services. The existence of these high marketing costs of milk with the prevalence of thinness in fluid markets and the risks attached to marketing perishables suggest the need of institutional arrangements and organized milk marketing centers such as cooperatives that effectively reduce transaction costs and increase milk market participation (Holloway *et al.*, 1999).

There are various players in the dairy sector that play critical roles at different levels. These players include individuals and institutions such as farm input suppliers, producers at different scales, farmers' organizations and cooperatives and unions, extension service providers, wholesaler and retail traders, small and large processors, distributors, industry facilitators, development partners and consumers as end users (Zelalem *et al.*, 2011; Agricultural Growth Project-AGP, 2013). This complex dairy value chain requires collaborative efforts and good institutional and or organizational set-ups and supports. So, along with the attempts to increase the production and productivity of milk, giving emphasis to institutional factors that affect the incentives and motivations of all actors in the dairy marketing is crucial.

1.2 Statement of the Problem

The poor performance of African agriculture is not only due to the difficult natural endowment and history of inappropriate policies, but also it is due to fundamental

institutional problems. For instance, the growth in smallholder dairying is limited by high transaction costs for both production and marketing and this is mainly due to the absence of dairy co-operatives (Staal *et al.*, 1997). Dorward and Omamo (2009) have also put thin market, weak institutions, and low level of economic activity among dispersed populations as three characteristics of poor rural economies in Africa. The lack of market infrastructure and institutions in rural areas indicate that many markets are thin and imperfect (Sinja *et al.*, 2006). Higher quality institutions lower transaction costs, encourage trust, reinforce property rights and avoid the exclusion of sections of the population. Contracting between producers' and buyers' cooperatives plays a central role in reducing transaction costs in dairy market. Institutional defects such as the failure of formal contract enforcement organization and of government structure can hinder market development (Juan, 2006).

Effective institutions can help in translating and implementing policies and investments. Their role is critical in that well designed policies and investments can only be successful with the presence of well-functioning and effective institutions. The role of institutions, such as those that determine the rules of the game, the regulation and the enforcement of contracts and property rights, and the provision of public goods and services, is even more important when these institutions interact with markets (World Bank, 2004).

Increased market exchange places demand on the institutional environment. A poorly developed institutional environment cannot support highly advanced technologies and markets, whereas highly developed institutional environment allows effective competitive markets and sufficiently develop to support increasingly intensive markets that are required for the coordination and exchange needed by more productive technologies (Dorward and Omamo, 2009).

Dairy marketing, as any marketing, needs institutions that govern the exchange of milk and milk products. The lack of adequate information and contractual arrangements leads the smallholder producers to lack lobbies in the legal environment and are not easily receptive to changes (Kherallah and Kirsten, 2001) and these factors result in high transaction costs which in turn leads to difficulties in formal market participations. When farmers are faced with high transaction costs, they will be either forced to stop participation in marketing or divert their means of marketing.

The problem of institutional or organizational setup is common in Ethiopia where dairy marketing activities take place. The producers claim that there is no promising price for their products as compared to the costs incurred for milk production and there are many other institutional factors that hinder to undertake well-functioning milk marketing activities. Consumers, cooperatives and processors, on the other hand, claim that there is shortage and unreliable supply and quality of milk and milk products. These two paradoxes indicate that there is problem of institutional arrangement and/or institutional environment that play a crucial role in facilitating the dairy marketing and add satisfaction to all the actors in the dairy marketing (Tilahun and Zeleke, 2013).

There is wide opportunity in milk production and marketing due to the favorable environmental conditions and increased demand for milk and milk products in big cities like Bahir Dar in particular and in the country in general. In addition to boosting agricultural production, creating favorable marketing environment that can accommodate increased supply and demand is crucial and needs more emphasis. As market exchange increases, there should be effective institutional set-ups that facilitate transaction of products especially products that need immediate exchange due to their nature of easily exposed to spoilage such as milk and milk products. These kinds of products need modern type of institutional arrangements such as formal contractual arrangements in order to create reliable and quality supply. Agricultural marketing uses institutional arrangements such as contract, personalized transactions and spot markets (Eaton *et al.*, 2008). These institutional arrangements in marketing create order; hence, they reduce conflicts and ensure mutual benefits for the marketing participant actors (Williamson, 2000).

Despite the importance of institutional environments and arrangements in dairy marketing, the existing situation and problem with in this set up in dairy marketing have not yet studied. The empirical studies conducted in Ethiopia on dairy marketing are focused mainly on milk market supply and milk market entry decisions and /or choice on different channels. Studies focusing on institutional analysis of dairy marketing have not been done so far in the study area. Thus, this study is aimed to analyze the institutional environments and arrangements in order to find the existing problems so as to give directions towards the solutions for the identified problems in dairy marketing in Bahir Dar Milk Shed area in the Amhara National Regional State (ANRS).

1.3 Research Question

The study attempted to answer the following research questions: what are the formal and informal institutional environments and institutional arrangements concerning dairy marketing in the study area? What do the relationships between dairy producers and different dairy marketing actors look like? What factors determine the milk market participation and volume of milk marketed of the dairy producers in the study area? What is the picture of existing institutional arrangements in milk marketing in the study area and what factors determine the dairy producers to use these alternative institutional arrangements? What alternative milk marketing channels are found in the study area and what factors determine the dairy producer's choice for these milk market outlets at point of first sale? What are the determinant factors for default in contractual agreements? What constraints and opportunities of Dairy marketing exist in the study area?

1.4 Objectives of the Study

The overall objective of the study is to analyze the institutional set-up of dairy marketing in Bahir Dar milk shed area. The specific objectives were:

1. To examine the institutional environments and arrangements in dairy marketing
2. To identify factors that affect milk market participation and level of participation of dairy producers
3. To assess the contractual agreement using of dairy producers and identify the determinant factors
4. To identify milk and butter marketing channels and determinants of milk market outlet choices at point of first sale
5. To identify determinants of breaching contractual agreement in milk marketing

1.5 Scope and Limitation of the Study

Study on institutional analysis is a wide and needs deep and large area of coverage. But due to shortage of financial capital and time constraint, the study was limited only on three districts in Bahir Dar milk shed area. However the result and the conclusions drawn in the study will be useful for all beneficiaries as it represents areas where dairy activities are carried out. Moreover, the study was limited only on focusing the institutional environments and arrangements in the dairy marketing focusing only on milk and to some

extent on butter marketing by using questionnaires and focus group discussions. Thus, the study may have limitations on deep institutional analysis in dairy marketing as a whole. However, it is important to note that as milk is the major component of the dairying, it will enable to understand the institutional aspects in the dairy marketing in the study areas and other similar areas of the region.

1.6 Significance of the Study

Dairy sub-sector in Ethiopia has many constraints. Low productivity of milk due to genetic and environmental factors, limited number of exotic dairy cows, low quality of milk and milk products, unorganized marketing systems (poor value chains), poor infrastructure for transportation of milk and milk products, lack of modern equipment for storage, and poor institutional or organizational linkages are among the major constraints in this sub-sector. Thus, this study attempted to analyze the problems in the institutional set-up in the dairy marketing. Recommendation based on these findings will assist policy makers to device better policy options to solve the identified problems such as lack of formal rules or regulations that govern dairy marketing. The findings of this study will also benefit research institutions and other development agencies. In addition to this, the study will benefit both the dairy producers and the consumers in particular and all the actors in the dairy marketing in general through improvements in the identified problems.

1.7 Organization of the Thesis

The remaining part of the thesis is organized as follows. Chapter 2 presents literature review on institutions and marketing from different sources. Chapter 3 represents description of the study area and methods of data analysis. In chapter 4, both descriptive and econometric results are discussed in detail. Chapter 5 summarizes the main findings of the study and draws conclusions and recommendations based on the findings.

2. LITERATURE REVIEW

2.1 Concepts and Definitions

Even the term institution has a long history of usage and is becoming widespread in the social sciences in recent years; there is no agreement in the definition of this concept. Furthermore, the endless conflicts over the definition of the terms of institutions and organizations have led some writers to focus on the practical matter than their definition (Hodgson, 2006). This section of the paper focuses on definitions given by some writers.

North (1990) has defined institutions as “the humanly devised constraints that shape human interaction”. The constraints include formal and informal rules and norms that determine the activities that individuals are permitted to undertake and how. He also defined institutions as the rules of the game that facilitate co-ordination or govern relationships between individuals or groups. According to North (1990, 1991), institutions are of formal rules, informal constraints, and the enforcement characteristics of both. The formal rules include the statute law, common law, property rights, constitutions, and regulations. The informal constraints constitute sanctions, taboos, customs, traditions, and codes of conduct. The informal institutions such as conventions, moral rules, or social norms maintain ‘order without law’ (Mantzavinos, 2001). Players depend on informal institutions may arise when formal institutions fail to do so.

Hodgson (2006) defined institutions as “the kind of structure that matter most in the social realm: they make up the stuff of social life”. He also added “institutions are systems of established and prevalent social rules that structure social interactions. Language, money, law, systems of weights and measures, table manners, and firms (and other organizations) are thus all institutions”.

Schmid (2004) qualifies the definition by arguing that institutions are more than just the rules of the game providing constraints. They are also enablement to do what the individual cannot do alone. They also affect beliefs and preferences and provide signals to uncalculated action.

The term institution also refers to many different types of entities, including both organizations and the rules used to structure patterns of interaction within and across organizations. This indicates that institutions are broad and encompass organizations and

doing institutional analysis includes, most of the time, organizational analysis. Institutional and organizational analysis refers to the analysis of and generation of understanding about institutions and organizations (Mathew, 2014).

Organizations are the players, groups of individuals bounded by a common purpose to achieve objectives. The constraints imposed by the institutional framework and with the other constraints define the opportunity set and therefore the kind of organizations that will come to existence. Organizations include political bodies, economic bodies, social bodies, and educational bodies. Political bodies include political parties, the senate, a city council, a regulatory agency. Economic bodies include firms, trade unions, family farms, and cooperatives. Social bodies comprise churches, clubs, athletic and associations. The educational bodies of organization include schools, colleges, and vocational training centers (North, 1995).

Hodgson (2006) on the other hand, defined organizations as special kinds of institutions with additional features. They are special institutions that establish their boundaries distinguish their members from nonmembers. They involve principle of sovereignty concerning who is in charge; and chains of command delineating responsibilities within the organization. This definition of Hodgson on organization differs from that of North in that North has characterized institutions from organizations in different ways. This different definition indicates that there is no such a universal and distinctive boundary between institution and organization and in some cases, they can be used interchangeably.

Organizations have important features such as their structure and functions and are designed to achieve specific goals; they have identifiable boundaries; they work within, or are influenced by; the institutional context, while usually also attempting to influence the 'rules of the game'; and they use resources, knowledge or technology to perform work related activities. Organizations are more closely associated with the association and action elements of the conceptual framework (Mathew, 2014).

Institutional arrangements are the set of rules and structures that govern contracts and agreements (Dorward and Omamo (2009). These institutional arrangements lower transaction costs and the institutional environment may also play a key role in determining the potential for this economizing to take place (Eaton *et al.*, 2008).

2.2 Overview of Institutions

The foundations of institutional economics were laid in the middle of nineteenth century. Bernard (2009) has defined institutional economics as “economic thought that considers institutions to be relevant to economic theory and it deals especially with the nature, origin and evolution of institutions and their effect on their economic performance”. The introduction to institutional economics follows the history of field since the 20th century. Institutional economics can be regarded as a family of theories that were initially influential in economics and share the idea that ‘institutions matter’ in the study of economics.

Institutions are written and unwritten rules, norms and constraints that are devised by humans to reduce uncertainty and for controlling their environment. They include: written rules and agreements, constitutions, laws and rules that govern politics, government, finance, society, and unwritten codes of conduct, norms of behavior, and beliefs. Institutions provide rules, constraints and incentives which are instrumental to the governance of exchanges (Menard and Shirley, 2008).

The conception of institutions and how they affect economic growth is derived to a large extent from the work of Douglass C. North. According to North (1990), institutions are "the rules of the game" of a society, this means that institutions establish the constraints, determine the costs and benefits, under which individuals take their economic decisions. Institutions enable ordered thoughts, expectations, and action by imposing from and consistency on human activities. Institutions have constraining and enabling behavior. The existence of rules in institutions implies the constraining effects. This presence of constraint can open up possibilities such as enabling choices and actions that otherwise would not exist. The rules allow us to communicate (languages); to flow more easily and safely (e.g. Traffic rules); to increase personal safety, that is, rule of law (North, 1990).

The effectiveness of enforcements determine the degree to which there is an identity between the objectives of the institutional constraints and the choices individuals make in that institutional setting. Enforcement is carried out by three parties, that is, by the first party (self-imposed codes of conduct), by the second party (retaliation), and/or by a third party (societal sanctions or coercive enforcement by the state). Institutions, together with the technology employed, affect economic performance by determining transaction and

transformation (production) costs and raise the benefits of cooperative solutions. In transaction cost terms, institutions reduce transaction costs and production costs per exchange so as to realize the potential gains from trade (North, 1991).

The need for institutions in trade or (marketing) arises with the growing of marketing (exchange) and new developments. With the new development, there arises new rights and then new law or rule comes to protect that right. As trade expands beyond a single village, the possibilities for conflict over the exchange grew. With the growth of the size of markets and with the increase in the transaction costs due to the dense social network, more resources must be devoted to measurements and enforcements. In the absence of a state that enforced contracts, religious percepts usually imposed standards of conduct on the players. As the scope of trade increases, the need for institutions such as enforcement (both the enforcement of agreement and protection of goods and services) increases. Personal ties, voluntaristic constraints, and ostracism are no longer effective as more complex and impersonal forms of exchange emerge. But this does not mean that personal and social alternatives are unimportant. These personal and social ties are still very important even in today's world (North, 1991).

Institutional aspects and their role in marketing and economic development revolve around transaction costs, market information flows and the institutional environment (Jari and Fraser, 2014). Institutional environment is made up of formal rules and informal constraints. It includes property rights, regulations, policies, informal rules, etc. Institutional environment represents political, social and legal rules of conduct that defines the basis for production, exchange and distribution (Davis and North, 1971). The political institutions can play role in reducing transaction costs by improving the security of property rights and enforcement of contracts. Institutional environment describes enforcement mechanisms, norms such as trust and legal systems and provides the structure in which economic decisions, actions such as selling, buying, and negotiating, and transactions to be performed smoothly. With its elements such as laws or regulations, enforcement mechanisms, and informal norms such as trust, institutional environment can affect marketing business.

2.2.1 Key Functional Elements of Institutions

Mathew (2014) has recognized four key functional elements of institutions. These are explained below.

Ways of **Meaning** in our lives: According to Mathew (2014), this aspect of institutions relates to the models we use to interpret our lives and the social and natural world in which we live. This aspect is about the way we make events, relationships, natural phenomena and time meaningful. Our individual beliefs and values; the overall cultural values and beliefs within which we live; the social norms that define, restrict and explain the overall values and beliefs within which we live, our religious beliefs, frameworks of scientific understanding and research, and so on are elements of this aspect of institutions. Due to their deep-rooted characteristics and are undocumented, these aspects of institutions are often called informal institutions. They are also known as exogenous institutions because they are external to the overall economic system and their existence at the socially-embedded level.

The **Association** we make: The association aspect involves the associations that people make with each other to work to achieve social, economic and political objectives. These may be formally organized such as governments, business, civil society or non-governmental organizations (NGOs). This element also encompasses the relationships, agreements and interactions between organizations, representing the informal aspects of associations. These elements may be exogenous (external part of the economic system) or endogenous (internal part of the economic system) (Mathew, 2014).

The basis for **Control** over individuals and organizations: This functional element of institution refers to the ways of maintaining control over what individuals or organizations should or can do. The control element of the institution covers the formal aspects (such as the laws, rules, regulations, mandates, strategies and policies) and informal rules, which may be deeply intertwined with meaning-making systems. Institutions, as a set of rules, can only be effective and sustained when they are legitimate, consistent and compatible with other institutions, and when they can be implemented and reviewed.

The **Actions** that are taken: Actions are carried out regularly by individuals and organizations. They include regular patterns of behavior by organizations or individuals, as well as the regular provision of services, functions and products that take place according to agreed-upon rules, laws and norms (formal and informal). Action describes the functional, real-world results of institutional and organizational interaction, that is, what people do (Mathew, 2014).

Institutions and organizations help in reducing poverty and foster development. They play a great role in accessing assets, services and knowledge of poor people to improve and sustain their livelihoods. Institutions and organizations promote social cohesion and stability, and provide collective voice to influence policy.

2.2.2 Functions of Institutions

Institutions have many important roles. But the fundamental functions that institutions perform in social and economic interactions between actors are enforcement and coordination functions (Dorward *et al.*, 2009).

Enforcement function: the enforcement function of institution is an activity conducted to ensure the agreement made between the actors. The enforcement function concerns many aspects. It concerns the informal and formal rules that define interactions. It also concerns the monitoring and sanctioning mechanisms through which rules and contracts for interaction between actors are enforced. The other concern of the enforcement function of the institutions is the roles of trust, community norms, morality, and social capital in enforcement. It also concerns with the motivation or incentive compatibility of enforcement and the impact of limitations of enforcement mechanisms on markets and other forms of exchange (Dorward *et al.*, 2009).

Coordination function: the other function of institutions is coordination. Coordination is to mean a process to encourage parties to take common or complementary actions to achieve individual goals. Coordination may be viewed as information and transaction cost/risk problem. The analysis in the coordination function is concerned with different aspects. The first aspect the coordination concerns is the information access and the sources of and extent of transaction costs and risk related to search, negotiate, monitoring, and enforcing property rights and exchange, the second concern in the analysis is ways the transaction costs determine contractual forms. The other concern of coordination is the economic organization of actors in collective, private, or state-dominated arrangements (Dorward *et al.*, 2009).

2.3 Old and New Institutional Economics

Old Institutional Economics (OIE) and New Institutional Economics (NIE) are the two approaches of institutional economics. The only linkage of strength between old and new institutionalism is the idea that institutions matter or the importance of institutions. Rather,

there is no major similar argument between the two branches of institutionalism. Many differences exist between the two institutionalisms. Old institutionalism believes in organic and holistic explanations of socioeconomic phenomena, depending on the social and collective generation of wealth; while new institutionalism's belief is based on the classical liberal view that the individual is the most important basic unit of analysis, and believes in that wealth is fundamentally dependent on the generation of private business and private profit. New institutionalism is therefore fundamentally based on neoclassical principles, whereas old institutionalism or neo-institutionalism in many aspects is closer to historical, post Keynesian, Neo-Marxist, feminist, and Schumpeterian political economy. Many institutionalists who contributed to the development of the old institutionalism include Thorstein Veblen, Wesley Mitchell, John Commons, Clarence Ayres, J.K. Galbraith, Gunnar Myrdal and Marc Tool. The new institutionalists who contributed for the development of new institutionalism also include Douglas North, Oliver Williamson, Mancur Olson and Friedrich Hayek (O'Hara, 1994).

The old institutional economics was the focus of economic research in the previous decades of World War II. It lacked rigorous and systematic theoretical foundations and comprehensive supporting empirical analysis. It was often country specific or even case specific and little effort to generalize was made. It tended to become politicized and driven by political agendas (Faskow, 2008).

The NIE is a relatively a new and an aggregate of multidisciplinary fields that include aspects of economics, history, sociology, political science, business organizations and law (Kherallah and Kirsten, 2001). In studying institutions and their interaction with specific arrangements, new institutionalists have become increasingly concerned with mental models and other aspects of cognition that determine how humans interpret reality, which in turn shape the institutional environment they build (North 1990; Williamson 2000).

Williamson coined the term New Institutional Economics in 1975 (Hodgson, 2009) to distinguish it from the OIE which is pioneered by Commons and Veblen. NIE is a reaction to perceived deficiencies in the state of economic science (Faskow, 2008). The NIE approaches have developed by removing some key assumptions (such as the perfect information, zero transaction, and full rationality) that underlie the basic neoclassical model. But assumptions like self-seeking individuals attempting to maximize an objective function subject to constraints still hold (Kherallah and Kirsten, 2001). NIE studies

institutions and how institutions interact with organizational arrangements (Menard and Shirley, 2008). This new direction of economics considers that the cost of transacting which is determined by institutions such as its legal, political and social systems; and by institutional arrangements is crucial to economic performance and it is this that gives the new institutional economics its importance for economists (Coase, 2000).

NIE has played a great role in understanding how formal institutions such as explicit incentives, authority, contracts, and ownership can be aligned to exchange conditions to increase organizational performance (Todd *et al.*, 2001). The particular focus of NIE approaches have been their emphasis on the problems that economic actors face as a result of imperfect information in transactions and the role of institutions in addressing (or exacerbating) such problems (Kirsten *et al.*, 2009). NIE focuses on imperfect transaction information and its analysis of associated institutional issues that is related to nonstandard behavior of actors, lack of complete markets or well-functioned property rights, and high information costs. The theory of NIE overcomes the paradox left by the neo-classical economics by first, assuming the bounded rationality among economic agents and second, the imperfect information (Thiam, 2014).

2.4 Themes of New Institutional Economics

Due to the expansion of economics into other social sciences, primarily law, politics and sociology, NIE is by definition a multidisciplinary field of study comprising several branches. Concluding about what falls under the NIE is still unclear and has debates but some agreement lead us to list some part of NIE. New economic history and the public choice school fields inform the institutional environment at the macro level while transaction cost economics and information economics for example inform more the micro analytical aspects of transactions and the forms of governance (Kherallah and Kirsten, 2001).

Though different scholars use different approaches to analyze institutions, there is no any common agreement on what should be included in the NIE (Nabli & Nugent, 1989). Richter (2005) has identified property rights analysis, transaction cost economics, contract theory and the new institutional approach to history as a NIE themes; while Bekele (2008) has identified property right, transaction cost, social capital and collective action as an

important themes to be included under the theme of New Institutional Economics. Thus, the four themes of NIE identified by Bekele (2008) are discussed in this paper.

2.4.1 Transaction Cost Economics

Transaction Cost Economics (TCE) is one approach of the New Institutional Economics focusing on the analysis of institutions for the exchange of goods and services. The NIE is preoccupied with the origins, incidence, and ramifications of transaction costs (Williamson, 1979). The general hypothesis of TCE is that institutions are transaction-cost-reducing arrangements that may change and evolve with changes in the nature and sources of transaction costs (Kirsten *et al.*, 2009).

Transaction cost theory was initially developed in the 1930s by Ronald H. Coase to explain why certain activities, products, or services are carried out internally in firms-while others are bought and sold in the market place. He made the crucial connection between institutions and transaction costs. The transaction cost theory deals with the real costs of allocating resources in an imperfect world of misunderstandings, misaligned goals, and uncertainty. Coase (1937) pioneered this work in his article “The Nature of the Firm,” in which he argued that market exchange is not costless. He pointed out the important role of transaction costs in the organization of firms and other contracts. He explained that firms emerge to economize on the transaction costs of market exchange and the boundary of a firm or the vertical integration depends on the magnitude of transaction costs.

Among the assumptions that new institutional economics differs from neoclassical economics is that individuals have incomplete information and the existence of costs in transactions. Because of the incomplete information, individuals face uncertainty about events and outcomes and incur costs to acquire information (Menard and Shirley, 2008).

The word “Transaction cost” was defined in many literatures by many scholars. Kirsten *et al.* (2009) defined transaction costs as “costs refer to the costs originating from the various actions taken to reduce the risk of transaction failure”.

Holloway *et al.* (1999) also defined transaction costs as the embodiment barriers to market participation by resource-poor small-holders and include the costs of searching for information and the partner with whom to exchange, screening potential trading partners, bargaining with potential trading partners to reach an agreement, and enforcing the

exchange agreement. Transaction cost is a cost incurred in making an economic exchange or it is a cost of participating in a market.

Coase defined transaction costs in his famous work “The Nature of the Firm” (1937) by asking two fundamental questions: “Why is there any organization?” and “Why isn’t all production carried out by one big firm?” Finally he understood the existence of transaction costs that determine what is done in the market, with price as the regulating mechanism, and what is done inside the firm, with bureaucracy as the regulator. Coase then pointed out that the distinguishing mark of the firm was the supersession of the price mechanism. Within this framework, he pointed out that all transactions carry a cost, either as an external market transaction cost or an internal bureaucratic transaction cost. According to Coase (1937), the most important market transaction costs are the cost of determining the price of a product or service, the cost of negotiating and creating the contract, and the cost of information failure. His understanding also goes that the internal transaction costs are associated with the administrative cost of determining the economic questions of what, when, and how to produce, the cost of resource misallocation, and the cost of demotivation. The Coase idea was neglected for many years. But several scholars started to expand the idea around 1970s among them was Oliver E. Williamson who dedicated his research to transaction cost theoretical issues for the last twenty-five years (Staffan, 1998).

Williamson (1975, 1985) was then extended the argument by explaining the importance of two behavioral assumptions in transaction cost economics. These are bounded rationality and opportunistic behavior of individuals. Bounded rationality relates to that human behavior is intendedly rational, but only limited (Herbrt, 1976). This limitation makes it impossible in structuring perfect contracts, and any contract will be incomplete even if all information is available. Opportunistic behavior means that the individual will act in self-interest and would break an agreement unless supported by enforceable commitments. (Staffan, 1998).

Transaction cost exists when transaction takes place. Economists usually talk about exchange in an economic system when commodities are physically transferred. But, the institutional meaning is the legal transfer of ownership, which is called transaction. Somebody owing a good, he/she can use it, save it, sell it, or give it away and by gave it or sell it away, he/she give up from the property right and transfers it to somebody else. Transaction costs involve the establishment and enforcement of exclusive property rights

and/or the definition and enforcement of the attributes of the good or service being exchanged.

2.4.2 Property Rights

Property right can be defined as the ability to freely exercise a choice over a good or service. It can also be defined as “the claims, entitlements and related obligations among people regarding the use and disposition of a scarce resource” (Furubotn and Pejovich, 1972). Even if it seems difficult to identify where the idea begins, Alchian (1958) started the modern attempt to go beyond a legal delineation of rights and begin talking about economic rights. Alchian’s early work on tenure (1958) and the pursuit of individual utility within the context of regulated firms (Alchian and Kessel, 1962) hinge on the property right structures of the institutions in question (Allen, 1997). Property rights usually are also referred to a bundle of rights and this bundle of rights encompasses use rights, extraction rights, transfer rights, exclusion rights, and encumbrance rights (Kirsten *et al.*, 2009).

Property right is among the formal rules of institution (North, 1990, 1991). A great deal of the literature on property rights and property ownership focuses on private property and commons property (Sim *et al.*, 2002). The existence of secure property rights is one concrete institutional element on which all authors agree as a major determinant of economic development. With investing new capital or in the case of intellectual property rights, people expect to have the freedom to use and profit from the invested investments. To do so, people need secured property rights to their capital not to be expropriated or ideas not to be stolen, and if it fails to do so, they will refrain from making investments and these results in low economic development (North and Weingast, 1989). Weak property rights can have an effect on the accumulation of physical capital. A primary function of property rights is that it guides incentives to achieve a greater internalization of externalities (Demstez, 1967).

2.4.3 Social capital

The concept of social capital is widely used and varies definitions have increased in scientific literature during recent years (Megyesi *et al.*, 2010). It has become one of the most popular exports from sociological theory in to everyday language. The social capital concept focuses attention on the positive consequences of sociability and it places those positive consequences in the framework of a broader discussion of capital and calls

attention to how such nonmonetary forms can be important sources of power (Portes, 1998). The theory of social capital elicits the central theme that capital is captured in social relations and that its capture evokes structural constraints and opportunities as well as actions and choices on the part of the actors. Social capital is understood by examining the mechanics and processes by which embedded resources in social networks are captured as investment (Lin, 2001a).

Social capital was defined by many scholars at different times. Putnam (1993) defined social capital as “features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions”. Other definition given by Lin (2001a) was that social capital is “resources embedded in a social structure that are accessed and/or mobilized in purposive actions.” Beard (2005) has also defined social capital as “social capital is one type of social relationship characterized by trust, reciprocity, and cooperation that is associated with positive community development outcomes (participation in civil society organizations that deliver public goods and services to communities.)”. Bourdieu (as cited by Portes, 1998) has defined the social capital concept as “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition”.

All definitions include an important aspect of social capital in which social network is centered as a common to all the definitions given. Social capital exists between actors, not attributable to an actor like human and economic capital (Coleman, 1988, 1990). Social capital is resources such as information, ideas, and supports that individuals are able to procure by virtue of their relationships with other people. These resources capital is social in that they are only accessible in and through these relationships, unlike the physical or human capital which are essentially the property of individuals (Grootaert *et al.*, 2004). Social capital, as an informal institution, increases the level of relationship and trust among people by smoothing the social interaction. Social capital serves as the links, shared values as well as understandings in a society by enabling individuals and groups to trust each other and perform their activities together in a sense of facilitating co-operations. Social capital facilitates co-operation, exchanging activities and innovations. People with a high socioeconomic status are more likely to have a high level of generalized trust than those with a low socioeconomic status (Sato, 2013). Embedded resource in social networks enhance the outcomes of actions by facilitating the flow of information; by exerting

influences on the agents; increasing certification or social credentials, that is, accessibility to resources; and reinforcing identity and recognition (Lin (2001a)).

2.4.4 Collective Action

An increasing amount of literature on collective action and natural resource has emerged during the last few decades (Ostrom, 1990). The theory of collective action has developed extensively after Mancur Olson (1965) published his seminal book “The Logic of Collective Action” in 1965 attempting to build a general theory which was motivating many scholars to delimit the core concepts, undertake further theoretical work and engage in empirical analysis (Ostrom, 2003). It is one of the general approaches of the new institutional economics which mainly deals with collective action and the elimination of the free-rider problem (Nabli & Nugent, 1989). Schmid (2000) also added that “the main agenda of institutional economics is collective action”. The theory of collective action is a useful tool to analyze how to overcome free-rider problems and fashion cooperative solutions for the management of common resources or the provision of public goods (Kirsten *et al.*, 2009).

Collective action was defined in many literatures written by different scholars. Wade (1987) has defined collective action as “action by more than one person directed towards the achievement of a common goal or the satisfaction of a common interest (that is, a goal or interest that cannot be obtained by an individual acting on his own)”. Marshal (1998) has also defined collective action as “the action taken by a group (either directly or on its behalf through an organization) in pursuit of members’ perceived shared interests”. Another definition of collective action given by Vermillion (2001) was “the coordinated behavior of groups toward a common interest or purpose”. McCarthy *et al.* (2002) has also defined collective action as “the act of internalizing negative externalities and/or the generation of positive externalities in the use and management of natural resources”.

Collection action arises when people collaborate on joint action and decisions to accomplish an outcome that involves their interests or well-being (Sandler, 1992). Actions that cannot be performed by individuals are done by collection of individuals who have common goals or interests. People may engage in collective action when they do some common activities such as producing and marketing their products; managing local irrigation systems; managing local community forests, and meet to decide on rules related to all these actions (Ostrom, 2004).

Besides its importance for economists and other social scientists, collective action is also one of the most challenging themes (Ostrom, 2010a). Collective action problems arise by interdependency among the participants, and the contribution or effort of one individual influences the contribution or effort of others, so no greater benefits are produced, and then all are worse off if they each act to maximize their own narrow self-interests (Kirsten *et al.*, 2009). Another very important challenge for the analysis of collective action refers to the understanding of the role of formal and informal organizations that coordinate and support such actions, since in some cases these organizations exist only on paper and collective action occurs spontaneously, while in other cases institutions may play a vital role in creating and coordinating local action for a shared interest (Meinzen-Dick *et al.*, 2004). With these and other challenges, explaining how collective outcomes can be realized given the self-interest motive of individuals and the desirability of joint effort to produce those outcomes is the key issue in collective action literatures (Nabli and Nugent, 1989).

Davies *et al.* (2004) distinguishes two types of collective action. The first is cooperation which is bottom-up and includes farmer-to-farmer collective action. The second type of collective action is coordination which is a top-down and includes agency-led collective action. This categorization implies the involvement of central or local government to provide support to the different strategies. According to Davies *et al.* (2004), some bottom-up collective actions may receive government support, while others may not find support from the government. Similarly, some top-down collective actions are supported by government policies but do not receive any support, while other collective actions receive support by local and/or government. It can be understood from this perspective that the literature on collective actions and institutional arrangements for managing common pool resources has increasingly recognized the dynamic dimensions of institutions.

2.5 The Coase Theorem as a Linkage between Transaction Cost Economics and Property Rights

The Coase Theorem is the most popular link between property rights and transaction costs (Marinescu, 2012). This theorem says that resource allocation does not depend on the distribution of property rights in the absence of transaction costs. In other words, the Theorem states that, in the absence of transaction costs, the allocation of resources is independent of the distribution of property rights. This Coase Theorem shows the importance of transaction costs when explaining the distribution of property rights.

Individuals try to maintain their existing property rights and to establish new ones if the former are not sufficient, thus leading to a property rights approach based on transaction costs. Thus, from the economic point of view, legal system that affects transaction costs should establish an institutional arrangement of property rights that favors the economic efficiency by means of minimizing harm or costs (Coase, 1960).

Coase (1960) shows the importance of transaction costs while taking into consideration the nature of bargaining, or contracts that can be easily affected in a negative way. According to the well-known and much mentioned hypothesis of zero transaction costs where property rights are well defined and enforced, negotiations are efficient as long as competitive markets exist (Allen, 1997).

2.6 Tragedy of Commons as a problem in Common Pool Resources

The expression of the “Tragedy of Commons” has become to symbolize the degradation of the environment since the Garrett Hardin’s challenging article (1968) whenever many individuals use a scarce resource in common (Ostrom, 1990). Hardin developed the Tragedy of the Commons by picturing a pasture taking it as a common pool of resources. Common pool resource is a resource which is open to all or having low excludability but the use of each such resource subtracts from that resource. Common pool resource includes natural fisheries, common grazing lands, hunting, or extraction of other natural resources (Kirsten *et al.*, 2009). Ostrom *et. al.* (1999) also defined common pool resources as ‘resources, usually natural, from which it is difficult to exclude users, and whose use reduces resource availability for others’. In open to all pasture, it is expected that each herdsman tries to keep as many cattle as possible on the commons seeking to maximize his gain by adding more animals to his herd and by doing this, he receives all the profits from the sale of the additional animal. The addition of animals without consideration of the impact of each addition on the pasture then brings overgrazing. The effect of the overgrazing is then shared by all the herdsman and the negative utility for any decision making herdsman is only a friction of the consequences. It is after that the tragedy of commons comes. Ruin is then the destination toward which all men rush, each pursuing his own best in a society that believes in the freedom of the commons, and this freedom in commons brings ruins to all (Hardin, 1968).

Solutions to the tragedy of commons reside on the use of institutions. Policy analysts agree on strong terms in calling for the imposition of private property rights whenever resources are owned in commons (Johnson 1972). Based on both economic analysis of common property resources and Hardin's solution for the tragedy of the commons, Smith (1981) suggested that the only way of avoiding the tragedy of the commons is by creating a system of private property rights. Welch (1983) also advocated the creation of full private property rights to a commons by asserting the importance of the establishment of full property rights as the optimal solution for all common pool problems. As the above suggestions explain, the solution to the so-called tragedy of the commons in the past that was agreed by many scholars was the establishment of enforceable property rights over the resources. However, there are still debates on the ultimate solution towards governing the commons and recent work by Ostrom (1990, 2005b) has shown that local institutional arrangements, including customs and social conventions designed to induce cooperative solutions, can overcome the difficulties of collective action and help achieve efficiency in the use of such resources (Nabli and Nugent 1989).

2.7 Definition and Concept of Marketing

In a narrow sense, marketing may be defined as selling and buying of goods and services. The concept of marketing must incorporate the entire organization, that is, it cannot be accomplished in isolation. Marketing involves more than just activities performed by a group of people in a defined area or department, but it is a process that focuses on delivering value and benefits to customers, not just selling goods, services, and/or ideas but it uses communication, distribution, and pricing strategies to provide customers and other stakeholders with the goods, services, ideas, values, and benefits they desire when and where they want them.

Marketing encompasses all business activities with the transfer of a product from the producers to the consumers (Kohls and Uhl, 2002). Marketing is an economic activity which stimulates further production and if efficiently done, both the producer and the consumer get satisfied. The producer gets sufficient price for his product and this encourages him to continue to produce more. The consumer gets the product at an affordable price and this stimulates continued consumption (Umar, 2005; Mafimisebi, 2012). Marketing is all about creating utility. Marketing activities play a major role in the creation of utility. By working to ensure that people have the type of product they want,

where and when they want it, the marketing system makes our lives easier (Solomon *et al.*, 2008).

Agricultural Marketing: The word agricultural marketing is composed of two words- agriculture and marketing. Agriculture, in its general term, means growing and/or raising of crops and livestock. In its broad sense, it includes cultivation as well as food processing, livestock farming, fisheries, and forest exploitation (Marie *et al.*, 2007). The word marketing indicates a series of activities involved in moving the goods from the point of production to the point of consumption. Marketing includes all the activities involved in the creation of time, place, form and possession utility. From this point of view, agricultural marketing refers to the performance of all business activities involved in the flow of food products and services from point of initial production until they are in the hands of consumers (Berhanu *et al.*, 2012).

Marketing Channel: The word channel is derived from the latin word '*canalis*', to mean canal. A marketing channel (also known as channel of distribution) can be viewed as a large canal through which products, their ownership, communication, financing and payment, and accompanying risk flow to the consumer (Charles *et al.*, 2008). It is a business structure or a set of interdependent organizations that ease the transfer of ownership as production moves from producer to business user or consumer (Charles *et al.*, 2008, Kotler and Armstrong, 2003). Marketing channel is a route through which agricultural products such as dairy products move from producers to consumers. They are alternative routes of product flows from producers to end consumers. With the purpose of moving products to their final consumption destination, marketing channel reaches from the point of product origin to the consumer.

Marketing channel facilitates the physical movement of goods through the supply chain, that represent place or distribution in the marketing mix and encompassing the process involved in getting the right product to the right place at the right time. There are different types of parties that participate in marketing channels. These channel members are also known as intermediaries, resellers, and middlemen negotiate with one another, buy and sell products, and facilitate the change of ownership between buyer and seller in the course of moving the product from the producer in to the hands of the final consumer and thereby, they can create a continuous reliable supply (Charles *et al.*, 2008).

Cooperative: International Co-operative Alliance (ICA) has defined cooperative as “a cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly owned and democratically controlled enterprise”. Another definition for cooperative was given by the United States Department of Agriculture (USDA, 2002): as “A cooperative is a business that is owned and controlled by the people who use its services and whose benefits (services received and earnings allocations) are shared by the users on the basis of use”. Cooperatives are established aiming at different objectives such as to solve problems collectively which members cannot individually and to minimize or reduce the individual impact of risks and uncertainties. Cooperatives increase the bargaining power of their members. Depending on their financial or management well-functioning, cooperatives can benefit even for non-members and communities around them in different ways such as in input supply, output marketing, stabilize prices, and advocacy.

Dairy marketing: the dairy marketing in this paper refers to marketing of milk and milk products with a special focus on milk marketing. It includes the whole activities performed by an individual or a group of people those participate in producing, selling of the product, institutions (such as the state, service providers, facilitators, distributors), and consumers. It is concerned with the movement of milk and milk products from the dairy farmers in the production locations to the final consumers found in the nearby cities. The dairy marketing process makes possible the delivery of milk and milk products to the buyers in the form, place, and time needed.

Dairy products: these are foods prepared from processing of milk. These may include butter, cheese, yoghurt, or others.

Dairying: it is an agricultural system which involves the production of milk and other dairy products from cows kept on special farm.

Milk shed: is an area where milk production is a major economic activity.

Contract farming: It is an institutional arrangement in response to high transaction costs or to market failure. It is also defined as “an agreement between farmers and processing/or marketing firms for the production and supply of agricultural products under forward agreement, frequently at predetermined prices” (Eatol and Shepherd, 2001). It helps to solve the difficulties of producers to access inputs and to market their commodities. It

promotes the linkage of smallholders to the market in case where the transaction cost of direct engagement with the market is high for producers or traders. Contract farming also helps the buyers or processors in solving the difficulty of obtaining sufficiently, timely and quality supplies. Effective contractual agreement needs effective institutional environment (Eaton *et al.*, 2008).

Three main objectives of contracts are identified by Bogetoft and Olsen (2002). The first one is that contract aims to ensure the right products are produced at the right time and place. The second objective is to help parties to have individual incentives to make coordinated decisions. Finally, the third objective is to provide coordination and motivation at the lowest possible cost. Contracts can be informal (that is, oral) or formal (written).

Informal contract: It is a contractual agreement in which the agreed norms of coordination can take the form of implicit conventions established by repeated interaction.

Formal contract: It is a type of contractual agreement that considers court or public legal enforcement to resolve in case of breaking the agreed issues (Guo, 2006).

2.8 Empirical Review on Institutional Analysis of Dairy Marketing

The empirical studies on dairy marketing conducted in Ethiopia focused only on milk market supply and milk market entry decisions and /or choice on different channels. Studies focusing on institutional analysis of dairy marketing have not been done so far in the country.

The studies have identified a number of milk marketing channels. These channels with different intermediaries have effects on both the producers and consumers. Woldemichael (2008) found that the shorter the channel, the more likely that the consumer prices will be low and the producer got a higher return. But since this type of channel is mostly related with informal system (informal channel), it may not be reliable due to lack of legal contractual agreements which is done, in most of the time, with formal channels such as with cooperatives and processors. The study conducted by the same author found that 60% of total milk marketed per day was provided through the Producer →Semi-wholesalers→Retailers →Consumers in Hawassa town. As it is indicated, this channel covers the large volume of milk supply among the channels identified. The study shows producer→Cooperative →Retailer→ Consumer; and Producer →Retailer →Consumer being the best

alternatives of channels chosen among the alternative channels in Shashemene and Yirgalem that covers 46.9% and 76.6% of total milk supplied per day respectively. Concerning the channels for butter, Producer → Itinerate; Producer → Farmer trader → Retailer → Consumer; and Producer → Farmer trader → Retailer → Consumer channels represent 72.2%, 46.2% and 41.7% of the daily supply in Hawassa, Shashemene, and Yirgalem milk shed areas respectively. But the study lacks describing factors affecting producers' choice of channels among the alternative channels.

Woldemichael (2008), found that age of the household head, education level of the household head, family size, and number of cross breed cows positively and significantly affect the entry of the dairy producer households to the dairy market while distance to nearest market and experience in dairy production negatively and significantly affect the participation of households in dairy marketing. Besides this, the study identified five variables that affect milk supply by the dairy producer households. The household size, number of cross breed cows, education level of the household head, and income from nondairy sources positively and significantly affect the volume of milk supply while age squared of the household head has negatively and significantly affected the milk supply.

In his study on the Dairy marketing patterns and efficiency, Gizachew (2005) found that about 51% of milk passes from the producer to consumer and this indicates that most of the milk marketing goes through the informal marketing system. The author also found that the second most important marketing channel to reach the consumer is the formal type, that is, through private processing industries and dairy cooperatives. Marketing channel for butter is another component of the study conducted by Gizachew (2005). He found that the highest percentage of butter passes directly from the producer to the consumer (about 82%) while 5.5% reaches the consumer through producers→mobile butter traders →consumers. In the study conducted by Gizachew (2005), variables that affect the volume of milk sale positively and significantly are extension visits, finance, loan, and number of cross breed cows while variables that affect the volume of milk negatively and significantly are educational level of household head and spouse, experience in dairy, and grain production. A study done by Berhanu *et al.* (2013) in Wolaita Zone (Ethiopia) has showed that access to dairy extension services, dairy farming experiences, landholding size and cooperative membership positively and significantly affect the accessing cooperative milk market outlet as compared with accessing individual consumer milk market outlet. Milking cow ownership and milk price by market outlets, negatively and significantly affect the

accessing cooperative milk market outlet as compared with accessing individual consumer milk market outlet.

D'Antoni and Mishra (2012) on their study found farmer's educational attainment positively affects the household's use of contract farming in milk marketing, while farm size and milk price negatively affect the use of contract farming in milk marketing.

A study conducted by Bardhan *et al.* (2012) on market participation behavior of smallholder dairy farmers in Uttarakhand (India) analyzed the factors that determine dairy farmers' choices of marketing channels. The study has indicated that volume of milk marketed lead to shift away from cooperatives to market as point of first sale. Milk production and extension contact have emerged as the two most important policy variables favorably influencing intensity of market participation. Distance to market has negatively influenced likelihood of producers' market participation.

Ineffective regulated institutional environment creates unsuccessful governance structure. These increase additional costs in implementing economic activities. A study conducted by Krstevska (2008) has indicated that difficulties in negotiation process and enforcement of contracts are the problems faced farmers in engagement with dairy processors. It also noted that entrance costs are also high for farmers engaged with dairy processors. On the other hand, farmers who choose to sell their product to small dairy processors experiences high cost of coordination and maintenance of contracts.

Study on institutions and efficiency of milk value chains conducted by Aniseth (2014) has revealed that spot markets were the dominant in the exchange process in the informal chain. In the formal chain, seven to ten days payments structure was common in the study area. He found that about 85% of all households who traded their milk in the informal channel were paid on spot/cash basis. The nature of interaction among the value chain actors was structured by the contractual arrangements agreed to in an exchange process. In his study, he observed that the formal and informal chain milk producers had short term informal type of contracts based on trust or mutual understanding about specific price and quality. The enforcement contracts between the producers and traders and between producers and consumers was highly dependent on trust and reputation built through repeated interactions and this has great role in reducing transaction costs. Even though there are laws and regulations regarding production and marketing of milk, about 58% of all sampled households were unaware of any laws and regulations governing milk

production and marketing. The study has indicated high transaction costs caused by spoilage and incomplete contracts and cost inefficiencies constraining dairy development in the study area.

Another study conducted by Canwat (2012) on choice of institutional arrangement for rice marketing indicated that effective price, interlocking transaction and membership of farming groups appear to encourage transactions under contractual arrangement, but he found that trust and being a rich peasant discourage it. Trust and being a rich peasant tend to encourage personalized transactions, while effective price, interlocking transaction and group membership discourage it.

A study conducted by Mailu *et al.* (2014) has indicated that collective action institutions such as milk cooperatives encourage farmers to engage in formal contractual agreements while households that do not participate in some form of collective action engagements in most cases made informal contracts. But they had found that both formal and informal contracts were equally subjected to contract breaches.

Most of the studies conducted on dairy marketing suggested that there is a need for institutional innovation to improve the sector. Thus, this study was attempted to analyze the institutional arrangements and environments and their constraints focusing on identifying the institutional gaps in the dairy marketing in the study area. In addition to this, the study analyses choice behavior of dairy producer households towards institutional arrangements; choice of dairy producer households to different agencies (marketing channels) and factors affecting them; and finally the major dairy production and marketing constraints.

2.9 Conceptual Framework

Effective dairy marketing is the outcome of many direct and indirect actors and enabling factors involved in different stages or functions such as in input supplying, production, marketing, and consumption of dairy products. Thus, institutional analysis focusing on the identification of actors, institutions, and activities is an important part in dairy marketing. The conceptual framework used in the study was the Transaction Cost Economics approach of the New Institutional Economics focusing on the analysis of institutions for the exchange of goods and services. The framework in TCE comprises the environment (exogenous variables); characteristics of goods and services being exchanged; and

characteristics of potential parties to a transaction by determining the institutional arrangements. The environment comprises the physical (infrastructural) environment, institutional environment and social/economic environments in the dairy marketing.

The heart of the framework in this study was the identification of the action domain in the dairy marketing. The action domain comprises the actors involved in the buying and selling of milk and milk products, the activities that directly interact with these exchanges and actors, and the institutions that govern these interactions. The activities include production and exchange processes that actors engage in and the resources and products (goods and services) that are managed, used, produced, and exchanged. The action domain can be affected by a wider environment which can be categorized in to three parts. These are the physical and infrastructural; the socio economic; and the policy and governance environments.

The relationship among the exogenous variables in the environment is crucial for effective dairy marketing. Infrastructural development in the form of roads, transport services, telecommunications and market places affects economic activities of the population and this affects their socioeconomic conditions. The improvement in the socioeconomic condition needs other new infrastructural developments and policy and governance with new rules and regulations as well as suitable administrative processes. There also exists an interaction between these environmental factors and the institutions, the activities and the actors (elements of the action domain). Macroeconomic uncertainties such as price or other environmental impacts like climatic changes tend to increase uncertainty among activities in the action domain and this demand for contractual forms in marketing activities. Thus, the elements of action domain can in turn affect the wider environment. The interactions among institutions, actors, and activities involve actions that lead to outcomes; and these outcomes may change the environment, institutions, activities and actors.

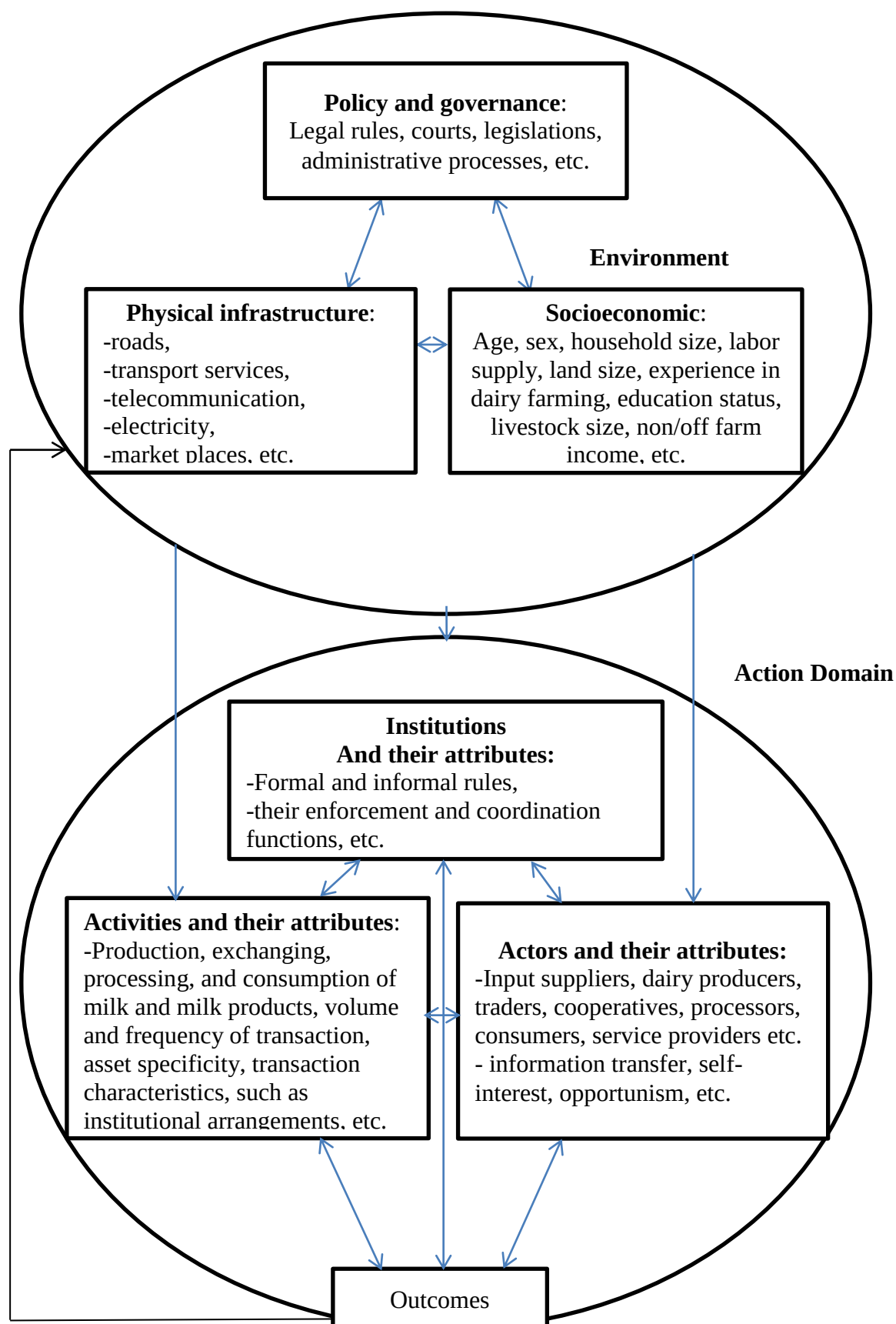


Figure 1. Conceptual Framework (Adopted and modified from Dorward and Omamo, 2009)

3. RESEARCH METHODOLOGY

This chapter discusses the research methodology used in the study. This includes location and description of the study area, type of data and data collection methods, sampling methods, and methods of data analysis.

3.1 Description of the Study Area

The study was conducted in Bahir Dar milk Shed area including Bahir Dar city (Bahir Dar Liyu Zone), Bahir Dar Zuria and Mecha districts in West Gojam of the Amhara National Regional State (ANRS). ANRS, with a population of about 19 million people is one of the nine Regional States in Ethiopia. ANRS has an area of 170,752 square kilometers and is endowed with about 46,348,519 million livestock population accounting over 27.42 % of total livestock population of the country. The Region has a population of about 13,766,923 cattle (CSA, 2013). There are 2.2 million milking cows in the region and these accounts 21.1% of the total milking cows in the country. The average daily milk productivity per cow is 1.505 liters. The percent share of milk production to the total country production is about 22% (AGP, 2013).

The ANRS Livestock Agency has identified many dairy corridors in the region and among them Bahir Dar Milk Shed area is one. Bahir Dar is taken as a representative of the Western part of the Regional state and is a capital city of the Region. Besides this, the city with its high population has a high demand for milk and milk products. As stated by Asaminew and Eyassu (2009), the area is characterized by uni-modal rainfall patterns, with rainfall distributed over the growing seasons, that is, from mid-May to mid-October. Bahir Dar Milk Shed is one of the major milk shed areas in Ethiopia.

Livestock Promotion Agency, Livestock Market Development in the Region, Zonal office of agriculture and District Office Livestock Desk are organizations established to facilitate in technical skills concerning livestock in the study area. Andasa Livestock Research Center under Amhara Region Agricultural Research Institute (ARARI) also facilitates on-farm research on various forage species. There are number of Farmer Training Centers (FTC) in the study area but their main focus is on crop production and natural resource activities and give less attentions to dairy production and dairy marketing. The major feed used for dairy production in the study districts is derived from crop residues and grazing land. In urban areas, the main source of feed is purchased hay. Oil cakes, wheat bran, and

byproducts of grinding mills are also considered to be supplementary feeds (Tilahun and Zeleke, 2013).

Despite high demand in all the study districts, supply of crossbred heifers is very limited. Bureau of Agriculture (BoA) and ARARI with the help of Improving Productivity and Market Success of Ethiopian Farmers (IPMS) also attempted improving availability of crossbred cows through hormone induced oestrus synchronization and insemination. Most animal health service has been handled by the government veterinary section under each district office of agriculture. Disease surveillance, outbreak controlling campaign and provision of vaccines is mainly carried out by the regional animal health clinic/laboratory. The involvement of private animal health service is only limited to supplying of various drugs especially antihelminthes, pesticides for internal and other external parasite control.

There is huge gap between milk supply and demand in Bahir Dar town than in other nearby areas. The demand for milk is by far higher than the supply all the times. Deliver of liquid milk to nearby towns is difficult due to long distance from the point of milk production. Milk processing takes place in Bahir Dar town using cream separator and churner. Milk collection and marketing cooperatives have been initiated in many kebeles (kebele is smallest administrative structure in Ethiopia) in Bahir Dar Zuria, Mecha district and Bahir Dar City. However, except some cooperatives existing with so many problems, others were collapsed. In most of the cafes, which are the main retailers of milk for the residents, it is rare to find milk during the afternoon hours. On the other side, milk produced in the rural areas beyond household consumption is processed to butter using traditional churners (Tilahun and Zeleke, 2013).

Amhara Credit and Saving Institution (ACSI) is found to be the major source of credit to dairy producer households in the study area. There are linkages between butter producers and traditional butter assemblers at the rural kebele markets and consumers in town. There is a kind of client relationship of trading in the area mostly based on mutual understanding. Except with in the cooperatives, milk marketing is mainly performed in informal agreement and there is lack of standard milk quality controlling systems and lack of standardized weighting scales in the study area.

Bahir Dar City: Bahir Dar City is the capital city of the ANRS. Administratively, Bahir Dar is considered as a special Zone (Bahir Dar Liyu). Bahir Dar city is situated on the

southern shore of Lake Tana (the source of Blue Nile). The city is located approximately 578 km away from Addis Ababa. With a total area of 42,160 hectares, Bahir Dar City is divided into 9 urban kebeles, 9 rural kebeles and 3 satellite kebeles (Zege, Meshenti and Tsis Abay), hence the city has total of 21 kebeles. About 17.2% of its total area is covered by water and it has less than 2% slope of land scape (Bahir Dar City Administration Regional Government Communication Bureau, 2016). It has a maximum and minimum elevation of 1800 and 1615masl respectively and a geographical location of 11°36' N 37°23' E. The temperature ranges from a maximum. of 26.4°C to a minimum. of 11.6°C with an average of 19°C. The City has a maximum rainfall of 1683 mm and a minimum of 895mm per year with an average of 1224 mm. The City has a total population of 317,275 of which 150,247 (47.4%) are male and 167,028 (52.6%) are females. Of the total population of the city, 218,366 are urban dwellers and 98,909 are rural dwellers. In the rural kebeles, maize, finger millet and *tef* are the dominant crop types grown while the dominant soil types are red and black soils (Woreda Office of Agriculture and Rural Development-WoARD, 2016).

Bahir Dar Zuria: Bahir Dar Zuria is one of the 13 districts in West Gojam Zone in the Amhara National Regional State (Figure 2). The district is bordered on the South by Yilmana Densa, on the Southwest by Mecha, on the Northwest by Semien Achefer, on the North by Lake Tana, and on the East by North Gondar. Bahir Dar Zuria includes 32 rural kebeles. Based on the Bahir Dar Zuria WoARD (2016), the total population of the district is about 202,960 of whom 104,009 are male and 98,951 females. The livelihood of the major section of the population in the district depends on crop-livestock farming system. The land use system of the district is 21% arable land or cultivable land, 9% pasture land, 8% forest or shrub land, 36% covered with water, and the remaining 26% is considered as degraded land or others (Wikipedia, 2016). The altitude of the district ranges from 1500 masl to 2500 masl (WoARD, 2016). It has a maximum temperature of 32°C and minimum temperature of 10°C. The geographical coordinate of the area is 11°15'N, 37°10'E (Wikipedia, 2016). Red soil is the dominant soil type in the district that accounts 87.2% while black soil accounts 12.8%. The dominant crops grown in the district include maize, *tef*, finger millet, and barely (district BoARD, 2016).

Mecha: Mecha district is one of the 13 districts in the West Gojam Zone of the ANRS. The district is bordered by Sekela on the South, by Agew Awi Zone on the Southwest, by South Achefer and Semien Achefer on the West, by Bahir Dar Zuria on the Northeast, and

by Yilmana Densa on the East. Mecha district has 43 kebeles of which 40 are rural kebeles and 3 are urban kebeles. Based on the Mecha WoARD (2016), the total population of the district is about 329,397 of whom 161,900 are male and 167,497 females. The urban population of Mecha district is 6,543 while the rural population is 322,854. The district has a crop-livestock mixed farming system. Elevation of Mecha district ranges from 2500 masl to 1500 masl. Mecha district lies within the geographical location of 11°30'N, and 37°00'E (Wikipedia, 2016). The temperature ranges from a maximum of 27°C to a minimum of 24°C. The maximum and minimum rainfall of the district ranges from 2000mm to 1000mm per year. Red soil is the dominant soil type in the area which accounts 98% while black soil accounts only 2%. The dominant crops grown in the district include maize, wheat, and *tef* (WoARD, 2016).

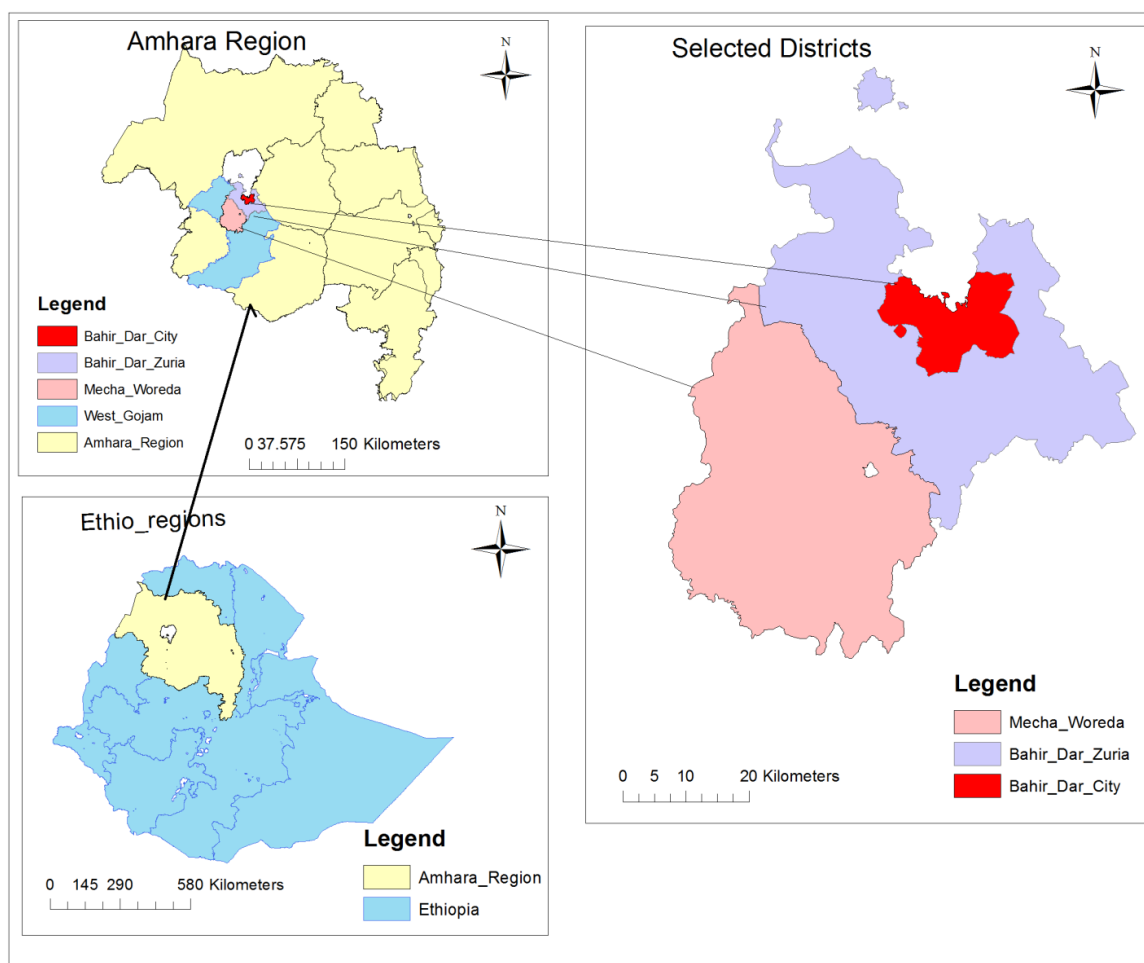


Figure 2. Sketch of the study areas

3.2 Type of Data, Source and Data Collection Methods

Both primary and secondary data were used for the study purpose. Primary data was collected directly from dairy cow producer households, milk and butter traders, milk cooperatives, processors, cafes/restaurants/ hotels, and individual consumers. Data was also collected from key informants and focus group discussions. Secondary data was collected from different sources such as Central Statistical Agency (CSA); Bureau of Agriculture and Rural Development; Regional, Zonal and District Trade and Industry Offices; from Livestock Agencies; and concerned institutions that have linkages with credit provision to livestock or dairy sector. Both qualitative and quantitative cross-section data were used. Before the actual data collection, pre-test was conducted to modify some of the questions either due to their irrelevancy or redundancy.

3.3 Sampling Method and Sample Size

Multistage sampling technique was used for the study. In the 1st stage, three districts including Bahir Dar Urban within Bahir Dar Milk Shed area were selected purposively based on their milk production potential. Based on this, Bahir Dar Zuria, Bahir Dar City, and Mecha districts were selected for the study purpose. In the 2nd stage, 2 kebeles were randomly selected from the purposely selected potential kebeles in each district and a total of 6 kebeles were selected for the study. The six kebeles selected were Huletu Yigoma (Andasa) and Sebat Amit from Bahir Dar Zuria district; Kebele 13 (Shimbit) and Kebele 14 (Ginbot Haya) from Bahir Dar City; and Bachima and Enamrit kebeles from Mecha district (Table 1). In the 3rd stage, households who have dairy cows were listed from each kebele and were randomly and proportionally selected for the study purpose.

Sample size for the dairy producer households was determined using Yamane's (1967) simplified formula for sample size determination, that is,

$$n = N / (1 + N(e)^2)$$

Where: n = sample size,

N = total population (total dairy producer households=2573)

e = the level of precision, that is, 0.08

Table 1. Sample size distribution in the sampled kebeles

Name of sample districts	Name of sample kebeles	Total number of dairy producers per kebele	Number of Sampled households per kebele
Badir Dar Zuria	Huletu Yigoma	650	40
	Sebat Amit	630	39
Bahir Dar City	Shimbit (Kebele 13)	300	19
	Ginbot Haya (Kebele 14)	153	10
Mecha	Bachima	390	24
	Enamrit	450	28
Total		2573	160

The total numbers of dairy producer households in the sample kebeles were 2573. Based on the formula for sample size determination, the total sample size would be 147. But for substituting missed samples (in case), the author took sample size of 160 dairy producers and used probability proportionate to size method to determine the sample size per each kebele. Sample of cooperatives, traders, processors, and consumers were included for the

study. Due to the lack of list of traders, non-random snowballing sampling method was used for sampling the traders. Based on this, 30 butter and milk traders were used for the study. The same sampling method (non-random snowballing sampling method) was used for consumers due to the lack of list of milk consumers. Three cooperatives were used for the study. Two cooperatives were selected from Bahir Dar Zuria and one cooperative was selected from Bahir Dar City. Even if it was intended to select one milk cooperative per study district, the cooperative found in Mecha district was not functional at the time of the survey year. So, one additional cooperative was selected from Sebat Amit Kebele found in Bahir Dar Zuria district which was one of the selected kebeles for the study. Due to the lack of milk processors in the selected rural districts, all the three sampled private milk processors were selected from Bahir Dar city based on random sampling method.

Six producer group discussions (one focus group per kebele) were also used to support the data found from the main questionnaire and to gather additional information. Besides these, three trader focus group discussions (one from each district) were conducted to support the main data collected from traders. Moreover, three key informants (one from each district) from Office of Agriculture and Rural Development in each district were interviewed regarding general dairy production and dairy marketing in the corresponding districts.

In addition to these, governmental offices/organizations and other NGOs those were related with dairy marketing and other institutions those facilitate and provide services in production and dairy marketing activities (such as credit institutions) were interviewed concerning.

Totally, 160 dairy producer households; 30 butter and milk traders; 27 consumers, 20 cafeterias/restaurants/hotels; 3 cooperatives, 3 milk processors, 8 organizations/institutions, 6 producer group discussions, 3 trader group discussions, and 3 key informants were used for the study purpose.

3.4 Method of Data Analysis

3.4.1 Descriptive Analysis

The descriptive analysis includes mean, standard deviation, percentage, and frequency distribution to compare the socio economics and institutional characteristics of the dairy household and the traders in the study area.

In addition to this, the formal and informal institutions and their roles in governing the various exchange arrangements; and agencies in the dairy marketing channel were described. The governance of the chain or rules of the game in general, that is, the interaction or the relationships within the dairy marketing actors, the types of actors in dairy marketing and their roles were also analyzed and mapped. Levels of trust the dairy producers have on different dairy marketing actors were measured using Likert scales (as used by Kane and Trochim, 2006). To measure the level of trust the dairy producers have on the cooperatives and the traders, several Likert-Type items or instruments are added onto the questionnaire. Cronbach alpha (α) is then used to measure internal consistency reliability of Likert-Type items (Cronbach, 1951). Cronbach alpha is mostly used when the research being carried out has multiple-item measures of a concept (Tavakol and Dennick, 2011). The Cronbach alpha is calculated as:

$$\alpha = \frac{k\bar{r}}{(1+(k-1)\bar{r})}$$

Where: k = number of indicators or number of items

$\bar{r}$ = mean inter-indicator correlation

The value for α indicates the percentage of the reliable variance.

Cronbach alpha is expressed as a number between .00 and 1.0. A value of .00 means no consistency in measurement while a value of 1.0 indicates perfect consistency in measurement (Tavakol and Dennick, 2011). The acceptable range is between 0.70 and 0.90 or higher depending on the type of research (How2Stat, 2015). As a rule of thumb, a questionnaire with an α of 0.8 is considered reliable (Field, 2009).

During the main survey and group discussion with selected producers and traders, institutional impediments/problems, constraints in dairy production and marketing were assessed. Linkages with input supply systems which includes financial; improved cow breeds; veterinary services and drugs; and feed as well as forward-linkages with output marketing systems were also described. The marketing channel for milk and butter in the dairy marketing was mapped and described. Opportunities in dairy production and dairy marketing were also identified by different marketing actors.

3.4.2 Econometric Analysis

Probit and Multinomial Logit Models (MNL) were used in the econometric part of the study. The decision of the dairy producer to participate or not in milk selling was assessed

by Probit Model based on a set of explanatory variables. The contractual agreement using behavior of the dairy producer, that is, whether he/she uses contract or non-contract for his milk sale was also another econometric issue estimated by Probit Model. This Probit Model was also used in assessing whether there is default or breaching of contracts or not between the contracting parties (that is, between the dairy producers and the milk buyer) in the dairy marketing. The other econometric model used was Multinomial Logit Model. This Model was used in the dependent variables having more than two alternatives in the decision making of dairy producer households. This model was used in estimating whether the dairy producer uses formal contract; informal contract; or non-contract to sale his/her milk. Market outlet choice at point of first sale (choice of marketing channel) has also been estimated using Multinomial Logit Model.

Probit and logit models are the two most common econometric models used when the dependent variable has a dichotomous nature. The difference between the two models is the nature of the underlying probability distributions (Maddala, 1992). Probit model assumes a normal distribution whereas logit model assumes a logistic distribution.

The probabilities of both models depend on the distribution of the error ε . Both distributions assume mean of 0, but they differ in variance. The Probit Model assumes ε normally distributed with mean of 0 and $\text{Var}(\varepsilon) = 1$. In the Logit Model, the ε is assumed to be distributed logistically with mean of 0 and $\text{Var}(\varepsilon) = \pi^2/3$. For both models, the probability of the event occurring is the cumulative density function (cdf) of ε evaluated at given values of the independent variables:

$$\Pr(y = 1/x) = F(x\beta) \dots\dots\dots (3.1)$$

Where F is the normal cdf Φ for the Probit Model and the logistic cdf Λ for the Logit Model.

There is no statistical theory for preferring one to the other. Due to this, it makes no difference which one to choose. The two models are similar in large samples, but in small samples the two models differ significantly. Both the Logit and Probit distributions are ‘S’ shaped, but they differ in the relative thickness of the tails, that is, Logit is relatively thicker than Probit. Hence, the choice between the Probit and Logit Models can be made on convenience.

Logit and Probit models can be derived from an underlying latent variable model (latent variable approach) specified as:

$$y_i^* = \beta'X_i + \mu_i \dots\dots\dots (3.2)$$

Where y_i^* is unobserved (predicted value). It is commonly called a latent variable. What we observe is a dummy variable y_i defined by:

$$y_i = \begin{cases} 1 & \text{if } y^* > 0 \\ 0 & \text{otherwise} \end{cases} \dots\dots\dots (3.3)$$

μ_i is the error term. X_i is a vector of explanatory variables and β is a vector of corresponding coefficients.

Specifically, the Probit Model is given by:

$$\Pr(y = 1 \mid x) = \int_{-\infty}^{x'\beta} \phi(t) dt = \Phi(x' \beta) \dots\dots\dots (3.4)$$

Where:

$\Pr(y)$ = the probability that the dummy response variable takes 1

X = is a vector of explanatory variables

β = is a vector of coefficient parameters

$\Phi = (.)$ represents the standard normal distribution function

Due to the non-linearity nature of the Probit and Logit Models, the interpretation of the estimated coefficients is less straightforward than linear or log-linear regression models. Even the statistical significance of the parameter estimates can be judged directly from the coefficient test statistics, the economic significance (or marginal effect) of a particular explanatory variable on the response variable is more complicated (Michael, 2008). Given the specification in equation (3.4), calculating the marginal effect of x on the expected probability (y) is:

$$\frac{\partial E[y \mid x]}{\partial x} = \phi(x' \beta) \beta \dots\dots\dots (3.5)$$

Where $\phi(.)$ is the standard normal density function. It is common to report the value of the marginal effect at the means of the independent variables since the marginal effect is dependent up on the value of x (Michael, 2008). In case of dummy explanatory variables, the marginal effect is simply the change in the expected probability, evaluated at the mean values of the remaining independent variables, when the dummy variable changes from 0 to 1 (Michael, 2008).

The author of this study has then used Probit model. The main purpose of this choice model is to determine the probability that an individual with a given set of explanatory

variables will make one choice rather than the other alternative. The binary dependent variables in this study are whether the dairy producer sells milk or not (Market Participation behavior); whether the dairy producer uses contractual agreement or non-contract for his milk sale and; whether there is default of contractual agreement between contractual parties or not. For the Market participation behavior of the dairy producers, the Heckman Two-stage econometric estimation procedure was employed. For the analysis of Contract or Non-contract using behavior; and for Default of contractual agreement, Probit Model was used.

Heckman Two-Stage Econometric estimation procedure

If two decisions are to be estimated such as the participation in milk marketing and intensity of participation, Heckman (1979) two-step estimation is the appropriate method for the analysis. It accounts for sample selection bias. As the name indicates, the Heckman two-stage econometric estimation procedure has two steps. The first step is the participation equation which indicates the probability of Milk Market Participation (MMP) by capturing factors affecting the market participation decision using the Probit Model. In this first stage, dairy producers decide a binary choice of whether or not to participate in milk marketing. In the second stage of the Heckman two-stage procedure, the intensity of volume of milk marketed will be estimated based on conditional on their first decision. In the second stage of the Heckman procedure, an additional variable called the Inverse Mills Ratio (IMR) calculated from the probit model is added to the model of the extent of participation to adjust the selection bias (selection bias is lack of having randomly selected sample).

Model specification:

Based on the two steps, specification of the Heckman two-step procedure has the following equations:

The Milk Market Participation (MMP) Equation: It is a Binary Probit Model equation:

$$Y_i = x_i \beta_i + \epsilon_i, \quad i=1, \dots, n \dots \dots \dots (3.6)$$

Where Y_i is a dummy variable indicating the milk market participation ($Y_i=1$ if $Y_i>0$, otherwise $Y_i=0$)

β_i are the variables that determine market participation

x_i is unknown parameter to be estimated in the Probit Model

ϵ_i is random error term

After the participation decision is carried out, a statistically adjusted value (Inverse Mills Ratio-IMR) calculated using the selection equation will be used as an independent variable in the Probit regression for our outcome of interest.

The Volume of Milk Marketed (VMM) or Supply Equation

$$Y_i = x_i \beta_i + \mu \lambda_i + \eta_i \dots \dots \dots (3.7)$$

Where: Y_i is the volume of milk marketed in the second step,

β_i are the explanatory variables determining the quantity of supply,

x_i is unknown parameters to be estimated in the quantity supply,

μ is a parameter that shows the impact of participation on the quantity supply,

η_i is the error term

Multinomial Logit Model

For the multiple choice dependent variables, Multinomial Logit (MNL) Model was employed. The Multinomial Logit Model is the most frequently used nominal regression model (Scotting and Freese, 2001). The MNL model is among the unordered choice models that can be motivated by a random utility model (Green, 2012). It is perhaps the most commonly used regression for nominal outcomes in the social science. The MNL model is easy to estimate and the interpretation is straight forward, (Cheng and Long, 2007). Multinomial Logit Model is the appropriate model to estimate factors determining the choice of institutional arrangements and the choice of market outlet at point of first sale when the institutional arrangements and marketing channel are mutually exclusive and the assumption of Independence Irrelevant Alternatives (IIA) is fulfilled. The concerned raised by many researchers is the assumption of the IIA that is implicit in the model (Alvarez and Nalgler 1995; Dow and Endersby, 2004). The IIA states that, all else being equal, a person's choice between two alternative outcome is unaffected by what other choices are available. Violations of the IIA can be tested by many tests. The two basic tests are the Choice set partitioning tests and model-based tests (Cheng and Long 2007). Choice set partitioning tests compare the results from the full MNL model estimated with all outcomes (choices) to the results from a restricted estimation that includes only some of the outcomes. IIA holds when the estimated coefficients of the full model are statistically similar to those of the restricted one but if the test statistic is significant, the assumption of IIA is rejected, and this indicates that using the MNL model is inappropriate. Model-based tests are computed by estimating a more general model that does not impose the IIA assumption and testing constraints that lead to IIA. The most commonly discussed

alternative models are multinomial probit, nested logit, and mixed logit (Cheng and Long 2007). However, the uses of these models are computationally more difficult and are less familiar to applied researchers. The most commonly used tests are the Hausman and McFadden (HM, 1984) test and the Small and Hsiao (SH) test, which are frequently discussed in econometrics texts (Cheng and Long, 2007).

The MNL (as used by Bardhan *et al.*, 2012), was used for the analysis of choice of formal , Informal, or Non contract agreement in milk selling and market outlet choices at point of first sale of milk by the dairy households those sell milk. The Multinomial Logit Model, which generates a different set of probability parameters for each of the possible outcomes when there are multiple discrete outcomes that do not have ordered relation, is the appropriate econometric model (Michael, 2008). The multinomial Logit can be used to predict a dependent variable on the basis of continuous and /or categorical independent variables, where the dependent variable takes more than two forms (Hill *et al.*, 2001). This model is then used to predict the relative probability that the dairy producer chooses one of the three categories in the market outlet choice at point of first sale and in the Formal agreement, Informal agreement or Non-contract selling behavior of the dairy producers for selling of their milk based on the nature of the explanatory variables.

In the MNL, the effects of the independent variables are allowed to differ for each outcome. The MNL model reports coefficients for the effect of each independent variable on each category relative to the base category. Based on its usefulness in studying selection among more than two alternatives, this Multinomial Logit Model is used for the analysis of decision choice on Formal contract, Informal contract, or Non-Contract market arrangements and it is also used in estimating different market outlet choices as point of first sale by the dairy producer households.

The dairy producers are faced with different market outlet choices to sell their products. It is then assumed that the decisions for these different choices are made on the basis of the option that maximizes their utility, subjected to institutional and technical factor constraints. The utility function will then be given as:

$$\text{Max } U = U(C_k, R_{fk}, R_{ik}; H_u) \dots\dots\dots (3.8)$$

Where: Max U represents the maximum utility that can be obtained from dairy marketing
 C_k represents the consumption of produced goods (milk) by the household.

R_{fk} is the revenue gained from formal marketing choice (for cooperatives and dairy processors)

R_{ik} represents revenue gained from informal marketing channel (directly to consumers, to other market (such as traders, hotels, restaurants, and cafeterias).

H_u represents a set of institutional and technical factors shifting the utility function

From the utility maximizing function, it can be seen that dairy producers make decisions to consume and market subjected to institutional and technical factors. Based on these, if the costs that are associated with using a particular channel are greater than the benefits, the households will not choose that channel and are forced to shift to another option that maximizes their utility. The amount of good k (milk) that is consumed or sold does not have to exceed the amount that is produced. But, due to the difficulty of measuring the utility directly, it is assumed that households make their participation choices based on the option that maximize their satisfaction (utility). The chosen destination (channel) must give the individual greater utility compared with other channels (Christiadi and Cushing, 2007)

The decisions on the participation of formal, informal, and or non-contract agreement in marketing also indicate the direction which maximizes utility. The formal contractual arrangement system or institutional arrangement is acceptable in legal bodies or institutions such as court in case during dispute while the informal contract is based on verbal or mutual understanding and has no acceptance in court. The MNL was then used to estimate the decisions on the multiple alternatives and also identified the factors that influence these choices.

Producers in the study area are expected not to sell, sell to formal, or sell to informal milk buyers. The formal milk buyers include dairy cooperatives, and dairy processors and they perform formal marketing systems that involves organized milk collection, processing, and distribution. The informal milk buyers (those who buy directly from the producers) include different milk buyers from producers such as village and urban final consumers, traders, hotels, restaurants, and cafeteria and hotels.

Based on these assumed milk buyers, the farmers were then classified in to three categories to generate the dependent variables for the Milk Market Outlet Choice at point of first sale. These groups were: (0) those who sell to other market (this comprises traders, hotels, restaurants, and cafeteria, and these are merged to this category due to being small number of suppliers sell to these buyers); (1) those who sell directly to consumers, (2) those who

sell to dairy cooperatives or dairy processors. Given the above alternatives, the probability that an individual i choose alternative j , can be expressed by the equation:

$$\Pr[Y_i = j] = \exp(\beta'_j X_{ij}) / \sum \exp(\beta'_j X_{ij}) \dots\dots\dots (3.9)$$

Where: $\Pr[Y_i = j]$ = the probability of choosing either selling directly to market (such as traders, hotels, restaurants, and cafeterias); selling to consumers; or selling to dairy cooperatives/dairy processors.

$j = 0, 1, 2$

$i = 1, 2, 3 \dots N$

X_i = represents the covariates

β_j = the unknown parameters to be estimated

The coefficients of the explanatory variables on the base category (the omitted) are assumed to be zero. Then the probability that a base category will be chosen can be specified as;

$$P_{ij} = \frac{1}{1 + \sum \exp(\beta'_j X_{ij})} \dots\dots\dots (3.10)$$

To draw conclusions about the direction, magnitude, and significance of model variables, marginal effect is one of the methods used in the Multinomial Logit Model outputs (Wulff, 2015). After the entire set of explanatory variables were tested using either Log likelihood Ratio (LR) or Wald test procedure, and if a specific predictor does not have a zero effect in the population and improves model fit statistics to a satisfactory amount over the base model, the predicted probabilities and marginal effects are calculated and analyzed to evaluate the sign, magnitude, and statistical significance of the marginal effects (Wulff, 2015). Hence the results are interpreted using the marginal effects. The marginal effects measures the expected change in probability of a particular category with respect to a unit change in an independent variable by comparing the estimated coefficients with the base category used in the model.

The marginal effects of the explanatory variables on the probability of the alternative choices are determined by differentiating the equation (3.9)

$$\delta_j = \frac{\partial P_j}{\partial X_j} = P_j [\beta_j - \sum_{j=0}^J (P_j)(\beta_j)], \text{ for } j=1, 2 \dots J \dots\dots\dots (3.11)$$

Where:

P_j is the probability that farmers choose Market outlet j in the Market outlet choice and in the Contractual type choice.

β_j is a vector of coefficient estimates in alternative j .

Before fitting the important variables in the models, the degree of multicollinearity among explanatory variables was measured. According to Gujarati (2004), multicollinearity is the existence of a perfect or exact linear relationship among some or all explanatory variables of a regression model. High degree of multicollinearity makes difficult the separate effect of explanatory variables on the dependent variable due to the existence of strong relationship among them. Variance Inflation Factor (VIF) was used to measure the degree of multicollinearity presence for the continuous variables. According to Gujarati (2004), VIF (X_j) can be defined as

$$\text{VIF}(X_j) = \frac{1}{1-R_j^2} \dots\dots\dots (3.12)$$

Where:

R_j^2 is the multiple correlation coefficient between X_j and the other explanatory variables.

The larger the value of the VIF, the more collinear the variable X_j is. As a rule of thumb, if the VIF of an explanatory variable exceeds 10 (this will happen if the R^2 exceeds 0.90), the variable is said to be highly collinear (Gujarati, 2004).

The other problem tested before running the model was heteroscedasticity and the Breusch-Pagan test was applied for detecting the heteroscedasticity problem.

The other measure used to test the degree of association among the dummy (discrete) explanatory variables was the Contingency Coefficients (CC). The CC measures the association between the row and column variables of a cross tabulation. The value of the CC ranges between 0 and 1. Close to 1 indicates high degree of association between discrete variables while approaching to 0 indicates low association of the variables.

$$\text{CC} = \sqrt{\frac{\chi^2}{N + \chi^2}} \dots\dots\dots (3.13)$$

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

3.5 Hypothesis and Definition of Variables

3.5.1 Dependent Variables used in the Econometric Models

Milk Market Participation (MMP): This is a Dependent Variable in the Probit Model (in the first step of the Heckman two-stage econometric estimation procedure) and indicates whether the dairy producer participates in milk selling or not and is assigned as the Milk Market Participation (MMP): It is a dummy variable that takes a value of 1 if the dairy producer participates in milk selling, 0 otherwise.

Volume of Milk Marketed (VMM): This is dependent variable in the second stage of the Heckman two-stage econometric estimation procedure. It indicates the volume of milk marketed by the dairy producers who sold milk and is measured in liters per day.

Contract or Non-Contract (CONC): This variable indicates whether the dairy producer who sells milk uses contractual agreement or not for selling milk. The value takes 1 for the dairy producer who uses contract agreement and 0 for the dairy producer who doesn't use contractual agreement for his/her milk sale.

Default or Non-Default (DND): This variable is for the presence or absence of default or breaching of contractual agreement in the dairy market (in the contracted parties who participate in contractual agreement in milk marketing). The value is assigned 1 if there is contractual default, 0 otherwise.

Choice of Formal Contract, Informal Contract, or Non Contract (FINC): This is dependent variable used in the multinomial logit model and indicates whether the dairy producer uses formal contract, informal contract, or non-contract to sell his/her milk. The value takes 0 for those who didn't use contract (Non-Contract); 1 for those who used formal contract; and 2 for those who used informal contract. Non-contract choice was chosen as the base category.

Market Outlet Choices (MKTOC): Market Outlet Choice at point of first sale was another dependent variable that was estimated in the Multinomial Logit Model. In the analysis of choice of different marketing outlets, the household faces many alternatives. Based on these alternatives, producers in the study area were grouped into three categories. These categories are dairy producers selling directly to consumers; dairy producers sell to

dairy cooperatives or milk processors (milk cooperatives and milk processors are grouped under one category because they are considered as formal marketing systems); and dairy producers selling to other markets (such as traders, hotels, restaurants, and cafeterias). The value takes 0 if the dairy producer sells milk to other market; the value takes 1 if the dairy producer sells milk directly to consumers; and the value takes 2 if the dairy producer sells milk to Dairy Cooperatives/Dairy processors, where other markets outlet choice was set as the baseline group (base category).

3.5.2 Independent Variables used in the Econometric Models

Based on the finding of different empirical studies and economic theories, definitions of the independent variables that were expected (hypothesized) to affect potentially the decision of dairy producer household either to participate in Milk Marketing or not, on Contract or Non-Contract; existence of Default or not; using Formal, Informal or Non Contract; and Market Outlet Choice are described and hypothesized below.

Age of the household head (AGEH): Age is an important variable which affects the decision behavior in milk market participation and on using contractual forms or not in milk marketing. It is a continuous variable measured in years. This variable was expected to decrease the probability of dairy household's participation in milk marketing and whether to use contract or non-contract. As the age of the dairy producer household increases, he becomes reluctant to use formal contractual agreement and tends to use other market alternatives such as personalized contracts. Bardhan *et al.* (2012) on their study on "market participation behavior of smallholder dairy farmers in Uttarakhand: a disaggregated analysis" indicated that as age of household increases, the tendency to participate in formal milk marketing decreases. Hence, this variable was assumed to decrease the probability of dairy households to use formal contractual agreement.

Sex of household head (SEX): Sex is an important variable in marketing decisions even though it depends on roles and responsibilities in different societies. In the management of livestock such as feeding, cleaning of shelters, milking and others activities, female contributes more labor. Sex is a dummy variable that takes the value 1 if the household head is male, 0 otherwise. Even the females contribute more in livestock management, due to lack of capital and access to institutional credit and extension services, female's

participation in dairy production and marketing faces obstacles (Berhanu *et.al.*, 2014). Therefore, this variable was expected to affect the milk market participation positively.

Education level of the household head (EDUC): With the increase in the education level, the household increases his tendency towards modern marketing system such as contractual based agreements. It is a categorical variable. The value will take 0 for the illiterate, 1 for those who are from grade 1-4, 2 from grade 5-8, 3 from grade 9-10 and the value of 4 for those who are greater than grade 10. Antoni and Mishra (2012) on their study on determinants of dairy farmers' participation in the milk income loss contract program showed that educational attainment had positive effect on the likelihood of participation in contractual agreement.. This variable was therefore expected to increase the probability of engaging in contract to sell milk. It was also expected to increase the likelihood of selling and intensity of milk by the dairy producer households. Non/off farm

Non/off Farm income (NFINC): This variable represents the additional income obtained from non-farm and off-farm activities. The additional income obtained from other non/off farm activities may increase his likelihood of selling milk due to additional investments in dairy farm. This income may also lead the household to use contractual agreement than other market arrangements such as personalized or spot market to sell milk. This variable is a dummy variable and it takes the value 1 if the household obtains income from other non/off farm income sources, 0 otherwise. Antoni and Mishra (2012) found in their study that other income obtained from off-farm activities had increased the probability to use contract agreement programs. Thus, this variable was expected to increase the probability of households in using formal contractual agreement with their buyers as compared to non-contract. This variable was also expected to have positive effect on the likelihood of the household to sell milk to different buyers. Mburu *et al.* (2007) in their study of determinants of smallholder farmers' adoption of various milk marketing channels found that income from other activities increased the likelihood of farmer's choice of cooperatives.

Price of milk in Kebele (PMILKK): This variable represents the price of milk in the kebele and is measured based on annual average price in Birr during the survey period. It is a continuous variable. This variable was expected to affect positively the milk market participation. The higher the price, the likelihood of the household to sell milk increases. Berhanu *et al.* (2013) in their study have also showed that the likelihood of accessing

cooperative milk market outlet decreased with milk price increase as compared to accessing individual consumer milk market outlet. Therefore, as compared with accessing individual consumer milk outlet choices, it was expected to affect negatively the accessing of cooperative and or processor milk market outlets due to the shifting of producer households towards market outlets that pay better prices.

Membership to other collective action group (MCAG): This variable indicates whether the dairy producer household is a member of other collective groups or not other than membership in milk cooperative. It is a dummy variable that takes the value of 1 if he/she is member of other collective action group, 0 otherwise. Being member to other collective action group, he/she can acquire information about the advantages of contractual agreement from other members. Hence, this variable was expected to affect negatively the probability of default in contractual agreement.

Household access to marketing information (ACCINF): This variable represents the access of the dairy producer household to milk market information. Access to market information is important variable in marketing business. Prior market information reduces transaction costs. Farmers prefer other arrangements when they are faced with problem of difficult access to price information. Farmer's marketing decision is based on market price information. Market information increases the output to be sold and this creates more opportunity to participate in contractual farming (Omiti *et al.*, 2009). It is a dummy variable that takes the value of 1 if the dairy producer has access to market information, 0 otherwise. This variable was then hypothesized to increase the probability of contractual arrangement using behavior of the dairy producer households. Jari and Fraser (2014) have used access to market as an influential factor to affect market choices and they found that households were most likely to increase participation in both formal and informal markets with the availability of market information. This variable was also hypothesized to increase the likelihood of dairy producer households to participate in milk marketing.

Total land holding Size (TLAND): It is the total land the household has during the survey year and is measured in hectares. The more the household owns land, the more he tends to produce forage to feed his dairy animals or may inclined to produce more crops depending on the benefits to be obtained. It seems to increase the likelihood of selling milk because of the increase in the possibility of allocating land to raise dairy cows and producing more milk that needs market. A study conducted by Berhanu *et al.* (2013) indicated that increase

with landholding size increases the likelihood of accessing to cooperatives milk market outlets. Another study by Bardhan *et al.* (2012) on the other hand, showed that land holding size has inverse effect on the likelihood of market participation and this may be due to the decrease of dependence on dairying as a supplementary source of income. Thus, the total land the producer owns was indeterminate in its effect. This variable was also indeterminate in its effect on default of contractual agreement.

Household Size (HSIZE): This variable represents the number of people living in the same house within the household and shares living. It is a continuous variable and is measured in adult equivalent. Staal *et al.* (2006) in their study of Smallholder Dairy farmers access to alternative milk market channels found out that farmer's choice of marketing channel was positively influenced by household size and increases the likelihood of selling to cooperatives/processors. This variable was therefore assumed to increase the likelihood of households to sell milk to cooperatives. It was also expected to affect negatively the probability of milk market participation, volume of milk supplied to market and using contract in selling milk.

Distance to nearest milk market (DISTNMKT): It is the distance from the household house to the nearest milk market. It is a continuous variable and is measured in kilometers. Bardhan *et al.* (2012) used distance to market as a determinant factor and found that it reduced the likelihood of producer households to sell milk but it increases the likelihood of selling to cooperatives because with increase in distance to market, farmers preferred to sell to dairy cooperatives in their village rather than selling to market and incur transport costs. It was then hypothesized to decrease the likelihood of selling milk to market and positively affect selling to cooperatives.

Distance to all weather road (ROAD): The accessibility to all weather road is an important factor in marketing of any agricultural products by minimizing the transport costs and time of transportation to the destination market places. This variable is a continuous variable that represents the distance from the household house to all weather road and is measured in kilometers. The households in far distance need to increase their ties with buyers through formal or informal contractual agreement and tend not to break contractual agreement. Hence, this variable was expected to decrease the default in contractual agreement.

Contact with Livestock extension agents (CONLEX): Extension service is an important tool in boosting agricultural productivity both in production of crops and livestock. It serves as a source of information and knowledge. The contact with livestock extension agent helps the dairy producer in using modern technology outputs and this in turn helps in increasing their agricultural productivity. Those farmers who have contact with livestock extension agent are more likely to know the advantages of producing and selling milk to which they might get greater benefits. It is a dummy variable representing availability of the dairy producer's contact with the livestock extension agent. The value will take 1 if the household has contact with livestock extension agent, 0 otherwise. A study conducted by Berhanu *et al.* (2013) has proved that the likelihood of accessing cooperative milk market outlet increases with increase in contact to dairy extension services. Therefore, the contact to livestock extension agent was hypothesized to increase the likelihood of selling milk to alternative market outlets. It is also expected to increase the milk market participation, volume of milk marketed and the contractual using behavior of dairy producers in selling milk.

Membership to Milk Cooperative (MRCOOP): Membership to milk cooperative has an advantage of sharing risks in losses that the individual cannot withstand had he/she been alone. It also helps in assuring continuous supply of milk to market even during demand fluctuation periods. It is a dummy variable that indicates whether the dairy producer is a member of milk cooperative or not. The value takes 1 if the dairy producer is a member to milk cooperative, 0 otherwise. Being a member to milk cooperative initiates the producer to participate in milk selling and also it increases the likelihood to use formal contractual agreements. Therefore, this variable was expected to affect the likelihood of dairy producers to participate in milk marketing and using formal contractual agreements.

Access to credit (ACREDIT): The accessibility of credit is an important in rural areas which help the farming community in fulfilling their financial requirements. Credit increases the financial capacity of producer households and they tend to expand their dairy business thereby increasing milk market participation. It is a dummy variable and it refers to whether the household has access to credit or not. The value takes 1 if the dairy producer has access to credit, 0 otherwise. This variable was then expected to increase the probability of milk market participation and the likelihood of selling milk to different markets outlet channels.

Livestock size excluding Dairy Cows (LSEXD): The number of livestock other than dairy cows helps to increase the asset value for the dairy producer households and this in turn helps him/her to purchase additional dairy cows which increases milk production. It is continuous variable measured in Tropical Livestock Units (TLU) and represents the total livestock size the dairy producer has other than dairy cows. Dairy cows were excluded due to their interrelated with volume of milk production. With the increase number of livestock the dairy producer has, milk production increases and with the increase in milk production, market participation increases. This variable was then expected to increase the likelihood of participation in milk marketing and using formal contractual agreements.

Experience in Dairy Farming (EXPDAIRY): It represents the number of years the dairy producer has experiences in dairy keeping. It is a continuous variable and is measured in years. Having an experience in dairying, the producer develops experience in milk production and tends to increase his milk market participation. Hence this variable was expected to increase the participation of milk marketing and participation in contractual based milk marketing arrangements.

List of Independent variables

List of independent variables used in the econometric models are summarized in Table 2.

Table 2. The independent variables used in the econometric models

Variables	Description	Type	Values	Expected sign in each model			
				Milk market participation	Volume of milk marketed	Contract or non-contract	Default or non-default
SER	Sex of the respondent	Dummy	0=Female, 1=Male	+ve	-ve	+ve	+ve
AGEH	Age of the household head	Continuous	In years	-ve	+ve	-ve	-ve
EDUC	Education level of the household head	Categorical	Level of education	+ve	+ve	+ve	+ve
HSIZE	Household size	Continuous	In adult equivalent	-ve	-ve	-ve	
EXPDAIRY	Experience in dairy farming	Continuous	In years	+ve	+ve	+ve	+ve
PMILKK	Price of milk in kebele	Continuous	In Birr	+ve	+ve		+ve
NFINC	Non/off farm income	Dummy	0= No, 1=Yes	+ve	-ve	+ve	
ACCINF	Household access to marketing information	Dummy	0=No, 1=Yes	+ve	+ve		+ve
LSEXD	Livestock size excluding dairy cows	Continuous	In TLU	+ve	+ve	+ve	
TLAND	Total land holding	Continuous	In hectares	+ve/-ve	+/-		+/-
MRCOOP	Membership to milk cooperative	Dummy	0=No, 1=Yes	+ve		+ve	
ACREDIT	Access to credit	Dummy	0=No, 1=Yes	+ve	-ve	+ve	+ve
DISTNMKT	Distance to nearest milk market	Continuous	In kilometers	-ve	-ve	-ve	
CONLEX	Contact with livestock extension agent	Dummy	0=No, 1=Yes	+ve	+ve	+ve	+ve
VMM	Volume of Milk Marketed	Continuous	In liters				-ve
MCAG	Membership to other collective action group	Dummy	0=No, 1=Yes				+ve
ROAD	Distance to all weather road	Continuous	In kilometer				-ve

Table 3 and 4 summarizes the independent variables used in Multinomial Logit Model in Formal Contract, informal contract or Non-Contract using behavior of dairy producers and in Milk Market Outlet choices at point of first sale in milk marketing. The expected sign of each explanatory variable influencing the choice of an option is explained in the variable definition specific to each choice.

Table 3. Variables used in Multinomial Model in Formal agreement, Informal agreement or Non Contract using in milk marketing.

Variables	Description	Types	Values
HSIZE	Household size	Continuous	In adult equivalent
EXPDAIRY	Experience in dairy farming	continuous	In years
NFINC	Non/off farm income	Dummy	0= No, 1=Yes
ACCINF	Household access to marketing information	Dummy	0=No, 1=Yes
LSEXD	Livestock size excluding dairy cows	Continuous	In TLU
MRCOOP	Membership to milk cooperative	Dummy	0=No, 1=Yes
ACREDIT	Access to credit	Dummy	0=No, 1=Yes
DISTNMKT	Distance to nearest milk market	Continuous	In kilometers
CONLEX	Contact with livestock extension agent	Dummy	0=No, 1=Yes

Table 4. Variables used in Multinomial Logit Model in Milk Market Outlet Choices at point of first sale

Variables	Description	Types	Values
SER	Sex of the respondent	Dummy	0=Female, 1=Male
EDUC	Education level of the household head	Categorical	Level of education
HSIZE	Household size	Continuous	In adult equivalent
EXPDAIRY	Experience in dairy farming	continuous	In years
NFINC	Non/off farm income	Dummy	0= No, 1=Yes
PMILKK	Price of milk in kebele	Continuous	In Birr
ACCINF	Household access to marketing information	Dummy	0=No, 1=Yes
ACREDIT	Access to credit	Dummy	0=No, 1=Yes
DISTNMKT	Distance to nearest milk market	Continuous	In kilometers

4. RESULTS AND DISCUSSION

This chapter contains the major findings of the study. The chapter is divided into three sections. The first section deals with descriptive statistics of the sample households. The second section of this chapter deals with institutional and marketing channel analysis in milk marketing. The third section contains the results of econometric analysis of the study and this comprises the Milk Market Participation of the dairy producers, the Contractual or non-contract using behavior of the dairy producers in milk marketing and the default in contractual agreement in milk marketing using Heckman two-step procedure and probit models. This section also contains the choice of institutional arrangements including Formal contractual agreement, Informal contractual agreement, or Non-contract in milk marketing by the dairy producers those sold milk; and the milk Market outlet choice of the dairy producers at point of first sale by using Multinomial Logit Model.

4.1 Descriptive Results

In this part of the study, the demographic and socio economic condition of sample households with their institutional factors are discussed. In addition to this, the potential variables hypothesized to influence farmers' participation in milk marketing and different contractual agreements as well as on choice of market outlet were tested for their statistical differences using appropriate tests. T-test was used to test the significance difference of the mean value of continuous variables between different groups in the sampled households. Chi²-test was also used to test the significant difference in dummy independent variables used in the study. One way ANOVA (Analysis of Variance) was also used to test the significant difference of continuous variables across more than two alternative dependent variables.

4.1.1 Socio-economic and Institutional Characteristics of Sample Households

A total of 160 sample dairy producers were used for the study purpose. Of the total sample respondents, 86.2% were male-headed households and 13.8% were female headed households. Out of the total female household heads, 20 (90.9%) were participated in milk selling whereas among the male household heads, 101 (73.2%) of them were participated in milk marketing and the chi-square test showed that there was a significant difference at 10% probability level among the two groups on their milk market participation (Table 5).

Education level: Out of the total sampled households, 87 (54.4%) of them were illiterate while the rest 73 (45.6%) were literates (Table 5). A chi-square comparison has indicated that there was a systematic association in education level and milk market participation with a chi-square value of 10.286 at 5% probability level. As it is observed from the table below, the number of participants increased as their education level increases. For instance, all of the dairy producers who are above grade 10 were participated in milk selling. This indicates that education plays a vital role in milk marketing and may help commercialization of rural households.

Table 5. Sex and education level of sample dairy producers by milk market participation

Variable	Description	Non-participants		participants		Total		χ^2 -value
		N	%	N	%	N	%	
Sex of the respondent	Female	2	9.1	20	90.9	22	13.8	3.232*
	Male	37	26.8	101	73.2	138	86.2	
Education Level of the respondent	Illiterate	28	71.8	59	48.8	87	54.4	10.286**
	From grade 1-4	8	20.5	22	18.2	30	18.7	
	From grade 5-8	2	5.1	22	18.2	24	15.0	
	From grade 9-10	1	2.6	10	8.3	11	6.9	
	Above grade 10	0	0.0	8	6.6	8	5.0	

Source: Survey data, 2016, **, and * are significant at 5% and 10% significance level.

The mean age of the respondents was 43.13 with a standard deviation of 11.47 (Table 6). An independent t-test has showed a significant difference in mean of age among the milk market participants and non- participants with 10% probability level. The sampled dairy producers have a mean household size of 4.97 adult equivalents with a standard deviation of 1.44. The experience in dairy farming of the sample dairy producers ranges from 1 up to 40 years with a mean of 17.69 years and a standard deviation of 9.76 and it indicated a significant difference at 10% probability level among milk market participants and non-participants (Table 6).

Table 6. Family structure of sample households by milk market participation

Variables	Non-Participants		Participants		t-value	Total	
	Mean	St.dev.	Mean	St.dev.		Mean	St.dev.
Age of the respondent	46.03	12.80	42.19	10.89	1.8299*	43.13	11.47
Household size in adult equivalent	4.95	1.68	4.97	1.36	-0.08	4.97	1.44
Experience in dairy farming	20.26	9.23	16.86	9.82	1.9060*	17.69	9.76

Source: survey data, 2016, * significant at 10% significance level.

Resource ownership

Table 7 summarizes the resource ownership of the sample dairy producers. The major economic resource of rural community is based on the landholding and livestock resources ownership. These are the basic resources for livelihood of rural people especially in agrarian countries like Ethiopia. The dairy producers in the sampled sites possess an average land size of 1.34 hectares with a standard deviation of 1.07 (Table 7) ranging from 0 to 4 hectares. This is greater than the Regional and the National average land holding which is 1.31 ha and 1.18 ha respectively indicated in CSA (2008b). The livelihood of rural community in Ethiopia depends on crop or on livestock or on both. Livestock is an important source of income. Livestock serves as food, plow land to cultivate crops, to generate income, used as a means of transportation, increase soil nutrient through addition of manure, serve as capital asset, and serves as immediate cash during drought periods. The livestock size the household has measured in Tropical Livestock Unit (TLU is equivalent to 250 kg) in the study area ranges from 0.75 TLU to 30.72 TLU with a mean of 6.51 and standard deviation of 4.40 showing significant difference at 5% probability level between milk market participants and non-participants.

Even though agriculture is the main source for the livelihood of respondents in the sampled households, some (36.3%) of them were also engaged in different non/off farm income generating activities. The highest income source other than farm income goes to fuel wood and construction wood selling in which it is earned by 5.6% of the total respondents. This was practiced especially by the respondents in Mecha district. The dairy producers who participated in non/off farm income generating activities earned a mean of 15,075.00 ETB per annum (Table 7). The t-test mean comparison analysis showed a significant difference in mean of non/off farm income between milk market participants and non-participants with a significant difference at 10 % probability level. The milk market participants and non-participants earn a mean of 17196.59 and 8407.143 ETB per annum respectively.

Table 7. Resource ownership based on milk market participation

Variables	Non-Participants		Participants		t-value	Total	
	Mean	St.dev.	Mean	St.dev.		Mean	St.dev.
Livestock size	5.21	1.86	6.92	4.88	-2.14**	6.51	4.40
Livestock size excluding dairy cows	3.66	1.58	3.96	2.85	-0.63	3.89	2.60
Total land holding size	1.17	0.70	1.40	1.16	-1.16	1.34	1.07
Non/off Farm Income	8407.14	8897.92	17196.59	15848.55	-1.97*	15075	14897.5
Volume of milk produced	2.26	1.21	11.57	8.12	-7.12***	-9.31	8.13

Source: Own survey data, 2016, ***, **, and * are Significant levels at 1%, 5%, and 10% significance level.

The sample respondents in the study area produce different amount of milk either for purpose of consumption at home or for sale or for both consumption and sale. An independent sample t-test comparison showed that market participants were superior in milk production than non-participants with significant difference at 1% significance level (Table 7).

Source of labor for dairy farming

Labor is a decisive factors in rural communities of agrarian countries like Ethiopia. Most agricultural activities are performed by human labor, and family labor contributes the highest share. Since the agricultural sector of the country is a subsistence type, it consumes family labor than hired labor. Among the total sample dairy producer households, 69.4% of them use family labor to perform their dairy farming activities while only 1.9% of them use hired labor (Table 8). The rest 28.7% of the sample dairy producers use both family labor and hired labor for dairy farming activities. The chi-square-test showed that there was significant difference in source of labor for dairy farming activities between the milk market participants and non-participants at 1% probability level. As it is indicated from the table below, all the dairy producers who use only hired labor for their dairy farming were milk market participants. Of the total respondents who did not participate in milk

marketing, 89.7% of them used only family labor while out of the total respondents who participated in milk marketing, only 62.8% of them used only family members for their dairy farming activity. Among the respondents who used both family members and hired labor for dairy farming, 91.3% of them were milk market participants.

Table 8. Source of Labor for dairy farming activity by milk market participation

Source of labor for dairy farming	<u>Non-participants</u>		<u>Participants</u>		<u>Total</u>		χ^2 value
	N	%	N	%	N	%	
Family member only	35	89.7	76	62.8	111	69.4	10.186***
Hired labor only	0	0.0	3	2.5	3	1.9	
Both family and hired labor	4	10.3	42	34.7	46	28.7	
Total	39	100	121	100	160	100	

Source: Survey data, 2016, *** Significant 1% significance level.

Access to Different Institutions

Access to Marketing information: Out of the dairy producers who have access to market information, 84 (88.42%) of them had participated in milk marketing whereas among the respondents who have no market information, only 37 (56.9%) of them were participated in milk marketing. The chi-square test comparison for the association of marketing information and milk market participation showed that there was significant difference in access to marketing information between the milk participants and non-participants at a significance level of 1% (Table 9). This shows how access to market information on milk price and milk demand affects the participation behavior of dairy producer respondents.

Access to Credit: Availability or access to credit may help in narrowing the shortage of financial gap in case when it is needed. Credit institutions such as microfinances in rural areas may be more important than in urban areas because rural areas are found in remote where there are shortages of formal financial institutions such as banks. Of the total respondents in the study area, 146 (91.2%) of them were found to have access to credit whereas 14 (8.8%) of them had no access to credit (Table 9). However, as the χ^2 test indicates, there was no significant difference on their milk market participation. Among the respondents who took credit in the survey year, 94% of them were used credit from Amhara Credit and Saving Institution (ACSI). This indicates that ACSI was the major credit source in the study area. The other credit sources for the dairy farming community were found to be relatives, friends, and local group associations.

Contact with Livestock Extension Agent: Access to extension service plays a crucial role in boosting agriculture both in crop production and livestock husbandry. Even though there was no statistical significant difference in the association between milk market participation and contact with livestock extension agent, more of the dairy producers who have contact with livestock extension agents were found to participate in milk marketing.

Table 9. Access to different institutions by milk market participation

Variables	Access	Non-Participants		Participants		Total		χ^2 value
		N	%	N	%	N	%	
Access to marketing information	No	28	71.8	37	30.6	65	40.6	20.772***
	Yes	11	28.2	84	69.4	95	59.4	
	Total	39	100	121	100	160	100	
Access to credit	No	2	5.1	12	9.9	14	8.8	.847
	Yes	37	94.9	109	90.1	146	91.2	
	Total	39	100	121	100	160	100	
Contact with Livestock extension Agent	No	10	25.6	27	22.3	37	23.1	.184
	Yes	29	74.4	94	77.7	123	76.9	
	Total	39	100	121	100	160	100	

Source: Survey data, 2016, *** significant at 1% significance level.

Distance to different institutions

Distance to all weather roads: The mean distance from the sample respondents' home to all weather roads was 1.51km with a standard deviation of 1.49. The t-test comparison showed significant difference in mean distance to all weather roads between the milk market participants and non- participants with a significant level of 5%. The milk market participants have less distance to all weather roads than the non-participants (Table 10). This was an indication of the importance of road for milk market participation.

Distance to nearest milk market: The sample respondents were far away from the nearest milk market by an average of 3.45 kilometers with a standard deviation of 2.77. Even the t-test comparison showed no significant difference in distance to nearest milk market between the participants and non-participants, the mean distance of the market participants seems shorter than the non-participants.

Table 10. Distance to different institutions in kilometers based on milk market participation.

Variables	Non-Participants (N=39)		Participants (N=121)		t-value	Total	
	Mean	St.dev.	Mean	St.dev		Mean	St.dev
Distance to all weather road	1.95	1.59	1.37	1.43	2.1534**	1.51	1.49
Distance to nearest milk market	3.72	2.26	3.37	2.92	0.6962	3.45	2.77

Source: Survey data, 2016, ** significant at 5% significance level.

4.1.2 Characteristics of Households by Contractual using

Sample dairy producers in the study area were divided based on their contract or non-contract using in milk selling. Among the dairy producers who participated in selling milk, 104(86%) of them sold milk in contractual bases while only 17(14%) of them sold their milk without contractual bases.

Even though there was no significant difference in age between contract users and non-users, average age of the users was slightly greater than mean age of the non-contract users (Table 11). This might be because increasing with age may lead to searching other alternatives of modernized selling milk such as using contractual bases than selling in spot market.

The contract user respondents had a mean of 17.12 years of experience in dairy farming with standard deviation of 9.83 years whereas the non-users have a mean of 15.29 years of experience in dairy farming with standard deviation of 9.89 years (Table 11). Even though there was no statistical significant association between experience in dairy farming and contractual using behavior of the sample dairy producers, households with greater dairy farming experience seemed to use contractual based milk selling systems than households with less experience in dairy farming.

The contractual based selling users were far away with a mean of 3.38 km and the non-contract users were 2.53 km from near milk market. However, there was no evidence of statistical difference to conclude the association of dairy producers' distance to nearest milk market and contractual using behavior of the dairy producer households (Table 11).

Table 11. Characteristics of sample households by contractual using (continuous variables)

Variable	Non-users (N=17)		Contract users (N=104)		t-value	Total	
	Mean	St.dev.	Mean	St.dev.		Mean	St.dev.
Age of the respondent	42.12	10.68	42.20	10.98	-0.029	42.19	10.89
Household size in adult equivalent	4.64	1.21	5.03	1.37	-1.114	4.97	1.36
Experience in dairy farming	15.29	9.89	17.12	9.83	-0.707	16.86	9.82
Distance to nearest milk market	3.24	2.53	3.38	2.98	-0.192	3.37	2.92

Source: Survey data, 2016.

Out of the total respondents who were engaged in generating other non/off farm income, 32 (30.8%) of them used contractual based selling of milk while among the dairy producers who do not have other non/off farm income generating activities, 72 (69.2%) of them used contractual based agreements to sell their milk (Table 12). The value of chi-square test is 10.012 showing a significant difference between the non/off farm income and contractual using behavior of the dairy producer households at 1% probability level. The reason for this could be that the dairy producer households with no non/off farm income want to secure their income from milk selling in a guaranteed way while the respondents who have other additional non/off farm income may not depend on contractual bases but tend to search other alternatives those might have better milk prices.

Table 12. Characteristics of sample households by contractual using (dummy/categorical)

Variable	Category	Non-users (N=17)		Contract Users (N=104)		χ^2 - value	Total	
		N	%	N	%		N	%
Non/off farm income	No	5	29.4	72	69.2	10.012***	77	63.6
	Yes	12	70.6	32	30.8		44	36.4
Access to credit	No	1	5.9	11	10.6	.360	12	9.9
	Yes	16	94.1	93	89.4		109	90.1
Contact with livestock extension agent	No	3	17.6	24	23.1	.249	27	22.3
	Yes	14	82.4	80	76.9		94	77.7
Education level of the respondent	Illiterate	9	52.9	50	48.1	2.958	59	48.8
	From grade 1-4	4	23.5	18	17.3		22	18.2
	From grade 5-8	1	5.9	21	20.2		22	18.2
	From grade 9-10	1	5.9	9	8.7		10	8.3
	Above grade 10	2	11.8	6	5.8		8	6.6

Source: Survey data, 2016, *** Significant at 1% significance level.

From the total sample households who participated in milk marketing, 59 (48.76%) of them were illiterates while the rest 62 (51.24%) were literates. Of the total illiterate respondents, 84.75% of them used contractual based milk selling while among the literate respondents, 87.09% of them used contractual based selling. However, there was no evidence of statistical difference to conclude the association of dairy producers' education level and contractual using behavior of the dairy producer households.

The contract users produced a mean of 11.87 liters of milk per day while the non-contract users produced a mean of 9.71 liters of milk per day hence having a difference of 2.16 liters of milk per day (Table 13).

Table 13. Volume of milk produced and marketed by contractual using behavior of dairy producers

Variables	Non-users (N=17)		Users (N=104)		t-value	Total	
	Mean	St.dev.	Mean	St.dev.		Mean	St.dev.
Volume of milk produced	9.71	8.47	11.87	8.06	-1.0171	11.56	8.12
Volume of milk marketed	6.57	9.16	7.70	6.75	-0.6076	7.55	7.11

Source: Survey data, 2016.

4.1.3 Household Characteristics by choice of Formal Contract, Informal Contract, or Non-Contract arrangements

Dairy producers in the study area who sold milk were categorized in to contract users or non-users. It has been observed that out of the total milk market participants, 14% of them did not use contractual agreement to sell their milk while the other 86% used contractual based agreement to sell their milk. Further, the contract users were also divided in to formal contractual agreement users and informal contractual agreement users. The formal contractual agreement was based on written document and it can have acceptance in court when default occurs. The informal agreement was not in written document but based on mutual understanding between the two parties (the seller and the buyer). Of the total sample respondents who participated in milk market, 17 (14%) of them did not use contractual based agreement to sell milk; 62 (51.24%) of them used formal contract; and the rest 42 (34.71%) used informal contract to sell their milk.

The average age of the sample respondents was 42.19 years. The age of the informal contract user was 43.78 years while the average age of formal contract users and non-contract users was 41.13 and 42.12 years respectively. However, the f-value 0.74 indicated in Table 14 showed no statistically significant of mean age difference among the three categories of marketing arrangement users.

The formal contractual market arrangements users had a mean of 18.44 experiences in dairy farming. The mean experience in dairy farming for the informal contractual users was 15.17 years while the non-contract users had a mean of 15.29 year experience in dairy farming (Table 14). However, there was no statistical significant difference in dairy farming experience among the different contractual arrangement users.

Table 14. Characteristics of sample households based on contractual arrangements (continuous variables)

Variable	Non-contract (N=17)		Formal contract (N=62)		Informal contract (N=42)		F- value	Total	
	Mean	St.dev.	Mean	St.dev.	Mean	St.dev.		Mean	St.dev.
Age of the respondent	42.12	10.68	41.13	10.17	43.78	12.03	0.74	42.19	10.89
Household size	4.64	1.21	5.19	1.28	4.79	1.49	1.74	4.97	1.36
Experience in dairy farming	15.29	9.90	18.44	8.35	15.17	11.51	1.66	16.86	9.82
Distance to nearest milk market	3.24	2.53	2.86	2.95	4.16	2.90	2.58*	3.37	2.92

Source: Survey data, 2016, * Significant at 10% significance level.

There was a significant difference at 10% significance level in distance to nearest milk market among the three institutional arrangement categories of sample dairy producers (Table 14). The informal contract users have longer distance to nearest milk markets with a mean of 4.16 kilometers. The mean distance to nearest milk market for the formal contract users and non-contract users were 2.86 and 3.24 kilometers respectively.

There was statistically significant difference in volume of milk produced and also volume of milk marketed among the different contractual arrangements (Table 15). The dairy producer households who used formal contractual arrangements were found to produce mean of 14.31 liters of milk per day whereas the non-contract and informal contractual agreement users were found to produce 9.71 and 8.26 liters of milk per day.

The f-value of 7.27 indicated in the table below have also confirmed the existence of significant mean variation among the three marketing arrangements in their volume of milk marketed at 1% significance level. The formal contractual agreement users sold a mean of 9.76 liters of milk per day as compared to 6.58 and 4.68 liters of milk marketed by non-contract users and informal contract users respectively (Table 15).

Table 15. Volume of milk produced and marketed based on contractual arrangements

Variables	Non-contract (N=17)		Formal contract (N=62)		Informal contract (N=42)		F-value	Total	
	Mean	St.dev.	Mean	St.dev.	Mean	St.dev.		Mean	St.dev.
Volume of milk produced	9.71	8.47	14.31	8.08	8.26	6.60	8.40***	11.57	8.12
Volume of milk marketed	6.58	9.16	9.76	6.87	4.68	5.34	7.27***	7.55	7.11

Source: Survey data, 2016, ***significant at 1% significance level.

The χ^2 comparison on other non/off farm income indicated a significant difference at 1% probability level among the three categories (Table 16.). Among the dairy producers who do not have other additional non/off farm income, 46 (59.74%) of them chose formal contractual agreement while only 16 (36.37%) of the dairy producers who have non/off farm income used formal contractual agreement bases to sell their product. Moreover, 26 (33.77%) of the respondents who did not have non/off farm income chose informal contract to sell milk while only 5 (6.49%) of the respondents those did not have non/off farm income chose non-contract to sell their milk. On the other hand, dairy producers who get non/off farm income were less participants in formal and informal contractual agreement as compared to respondents without non/off farm income. This might be due to the reason that because respondents who have no other non/off farm income use formal and informal contract based sales as security for sustainable income sources.

Access to marketing information had showed significant difference at 1% significance level on the household's choice to different marketing arrangements. Out of the total respondents who did not have access to market information, 9 (24.32%) of them chose formal contractual agreement while among the respondents who have access to market information, 53 (63.09% of them used formal contractual agreement to sell their milk (Table 16). On the other hand, 53 (85.5%) of the respondents who use formal contractual agreement to sell their milk were found to have access to market information while 9 (14.5%) did not have access to market information. Thus, access to market information was found to be positively related with using contractual agreement. Among the respondents who have no access to marketing information, 22 (59.46%) of them used informal contract agreement whereas only 20 (23.81%) of the respondents who have access

to market information use informal agreement based on mutual understanding to sell milk. This significant difference also showed how the informal agreement was dominant in case where there was no access to market information.

Table 16. Characteristics of sample households based on contractual arrangements (dummy/categorical variables)

Variable	Category	Non-contract (N=17)		Formal contract (N=62)		Informal contract (N=42)		χ^2 -value	Total	
		N	%	N	%	N	%		N	%
Other non/off farm income	No	5	29.4	46	74.2	26	61.9	11.646***	77	63.64
	Yes	12	70.6	16	25.8	16	38.1		44	36.36
Access to marketing information	No	6	35.3	9	14.5	22	52.4	17.118***	37	30.57
	Yes	11	64.7	53	85.5	20	47.6		84	69.42
Access to credit	No	1	5.9	5	8.1	6	14.3	1.445	12	9.92
	Yes	16	94.1	57	91.9	36	85.7		109	90.08
Contact with livestock extension agent	No	3	17.6	9	14.5	15	35.7	6.739**	27	22.31
	Yes	14	82.4	53	85.5	27	64.3		94	77.69

Source: Survey data, 2016, ***, ** significant at 1%, and at 5% significance level.

Contact with livestock extension agent was significantly associated with choosing alternative contractual based agreements of the dairy producers in selling milk at 5% probability level. Of the total 94 dairy producers who have contact with livestock extension agent, 53 (56.38%) of them chose formal contractual agreement while only 27 (28.72%) of them use informal contractual agreement. Out of the total dairy producer households who have no contact with livestock extension agent, 15 (55.55%) of them were found to prefer informal type of selling milk while only 9 (33.33%) of them used formal type of milk selling (Table 16).

4.1.4 Household Characteristics by Market Outlet Choices at Point of First Sale

Dairy producer households in the study area sell their milk to different agents based on different criteria. Among the major criteria were payment on agreed time for their milk, lack of awareness of any other buyers, good price for their milk, volume of sale, trust the dairy producer has on their buyers, and nearness to their buyers. Three major milk market

outlets were identified in the study area those serve as alternatives of milk market to the dairy producers. The first market outlet channel was comprised of traders, cafeterias, restaurants and hotels, and was categorized under the “other market”. The second outlet was selling directly to consumers. The third identified milk market outlet channel at point of first sale was milk cooperative/milk processors. Out of the total sample dairy producers in the study area who sold milk, 21(17%), 35 (29%), and 65 (54%) of them sold to other markets, directly to consumers and to dairy cooperatives/Milk processors respectively.

Among the female respondents who sold milk, 11 (55%) of them were found to sell milk to dairy cooperatives/milk processors and 6 (30%) and 3 (15%) of them chose selling directly to consumers and to other markets respectively. Of the total male respondents who sold milk, 54 (53.5%) of them were found to sell to cooperatives/milk processors while the rest 29 (28.7%) and 18 (17.8%) sold directly to consumers and other markets respectively. However there was no evidence to conclude the existence of a statistically significant association between sex of the respondents and choice of milk market outlets (Table 17).

Education level of the sample respondents differ significantly at 1% probability level by milk market outlet choices (Table 17). As it is confirmed by the chi-square test from the table, increasing in education level of the respondents increased the probability of choosing cooperatives/processors to sell milk. For instance, among the respondents who were above grade 10, 7 (87.5%) of them chose dairy cooperatives/milk processors as their market outlets for milk sale. Moreover, 100% of the respondents who were from grade 9-10 chose dairy cooperatives/milk processors to sell their milk. On the other hand, among the dairy producers who sold milk to consumers, most of them (62.86%) were illiterates whereas among the dairy producers who sold their milk to dairy cooperatives/processors, only 22 (33.85%) were illiterates. This might be because that education increases knowledge of marketing and the advantage of selling to formal marketing systems.

Sample respondents who did not have other non/off farm income preferred selling to dairy cooperatives than other marketing channels than those respondents who have other non/off farm income. This was statistically confirmed by the chi-square test with significant association at 10% probability level (Table 17). Among the dairy producers who did not have other non/off farm income, 47 (61.02%) of them chose dairy cooperatives/milk processors for their milk market at point of first sale, while the rest 18 (23.38%) and 12 (15.58%) chose consumers and other market respectively as their buyers of milk. Whereas,

among the dairy producers who did have other non/off farm income, only 18 (40.9%) of them chose dairy cooperatives/milk processors for their milk market at point of first sale.

The chi-square comparison test showed that there was statistically significant association in dairy producer's access to market information and among their milk market outlet choices at 1% significance level. Among the dairy producers who have access to market information, 56 (66.67%) of them chose dairy cooperatives/milk processors as their milk market outlet choices at point of first sale whereas among the total dairy producers who did not have access to market information, only 9 (24%) of them chose dairy cooperatives/milk processors as their buyers of milk at point of first. On the other hand, 9 (13.8%) of the dairy producers who chose dairy cooperatives/milk processors as milk market outlet choices at point of first sale did not have access to marketing information while 56 (86.2%) of them did have access to market information. Majority of the dairy producers who did not have access to market information about milk demand or price chose consumers as their milk buyers at point of first sale. This might be due to the lack of awareness of other market alternatives.

Among the dairy producers with access to credit, 60 (55.05%) of them were found to choose dairy cooperatives/milk processors for their milk market outlet choices at point of first sale while 29 (26.61%) and 20 (18.35%) were found to choose consumer and other market outlets at point of first sale. However, the chi-square comparison test showed no statistically significant association between the dairy producer's access to credit and among the different milk market outlet choices at point of first sale.

Table 17. Household characteristics by milk market outlet choice at point of first sale (dummy/categorical variables)

Variable	Category	Market outlet choice of dairy producers						Chi ² -value	Total	
		Other market (N=21)		Consumer (N=35)		Dairy cooperatives/milk processors (N=65)				
		N	%	N	%	N	%		N	%
Sex of the respondent	Female	3	14.3	6	17.1	11	16.9	.093	20	16.5
	Male	18	85.7	29	82.9	54	83.1		101	83.5
Education level of the respondent	Illiterate	15	71.4	22	62.9	22	33.8	25.74***	59	48.8
	From grade 1-4	4	19.0	9	25.7	9	13.8		22	18.2
	From grade 5-8	2	9.5	3	8.6	17	26.2		22	18.2
	From grade 9-10	0	0	0	0	10	15.4		10	8.3
	Above grade 10	0	0	1	2.9	7	10.8		8	6.6
Availability of other non/off farm income	No	12	57.1	18	51.4	47	72.3	4.749*	77	63.6
	Yes	9	42.9	17	48.6	18	27.7		44	36.4
Access to marketing information	No	6	28.6	22	62.9	9	13.8	25.79***	37	30.6
	Yes	15	71.4	13	37.1	56	86.2		84	69.4
Access to credit	No	1	4.8	6	17.1	5	7.7	3.030	12	9.9
	ves	20	95.2	29	82.9	60	92.3		109	90.1

Source: Survey data, 2016, ***, * significant at 1%, and at 10% significance level.

Dairy producer households who chose dairy cooperatives/milk processors as their milk market outlet at point of first sale had household size with a mean of 5.15 adult equivalents (Table 18). Dairy producers who chose consumer and other market as their first point for their milk sale had household size with a mean of 4.65 and 4.96 respectively. However there was no statistically significant evidence to conclude about the association between household size and among the milk market outlet choices.

Experience in dairy farming differs significantly at 5% significance level among the dairy producer households who sell to different market outlets (Table 18). Among the sample respondents who sold milk, the dairy producers with smaller mean (12.74 years) of experience in dairy farming sold milk directly to consumers whereas the dairy producer

households with higher experience in dairy farming chose other market (to traders, cafeterias, restaurants and hotels) to sell their milk. This might be because of that the dairy producers who have small experience did not develop experience in searching other market alternatives while the respondents with higher experience in dairy farming might develop experience in searching other market alternatives.

Table 18. Household characteristics by milk market outlet choice at point of first sale (continuous variables)

Variables	Other market		Consumer		Dairy cooperative/milk processors		F-value	Total	
	Mean	St.dev	Mean	St.dev	Mean	St.dev		Mean	St.dev
Household size	4.96	1.23	4.65	1.39	5.15	1.36	1.61	4.97	1.36
Experience in dairy farming	19.62	10.96	12.74	9.91	18.18	8.80	4.78**	16.86	9.82
Price of milk in kebele	9.66	1.13	10.77	2.02	8.87	0.60	26.01**	9.56	1.50
Distance to nearest milk market	3.58	3.00	4.21	2.77	2.85	2.90	2.63*	3.37	2.92

Source: Survey data, 2016, ***, **, and * significant at 1% significance level.

The F-test analysis showed that there was statistically significant systematic association in price of milk in kebele and milk market outlet choices at point of first sale with 1% probability level (Table 18). Respondents in kebeles with higher price tended to sell milk directly to consumers while respondents in kebeles with less milk price chose selling their milk to dairy cooperatives/milk processors and this might be due to the fact that dairy cooperatives/milk processors pay smaller price for their suppliers but they bought milk in sustained way whereas consumers bought milk with higher price but they may not be constant buyers.

Using the f-test mean comparison analysis, distance to nearest milk market showed a significant association at 10% significance level in household's choice to different milk market outlet choices (Table 18). Respondents with nearest milk market chose selling to cooperatives/processors whereas respondents who were far away from milk market chose consumers at point of first sale to their milk. This might be because as the distance

increases, the dairy producers have no other alternatives to sell their product but are forced to sell to consumers found around their vicinity. Dairy producers who chose dairy cooperatives/milk processors as their milk market outlet at point of first sale were located near 2.85 km away from nearest milk markets while the dairy producers who chose consumers and other market were located 4.21 and 3.58 km away from the nearest milk market respectively.

4.2 Institutional Environments and Arrangements in Dairy Marketing

Institutional environments consist of laws, regulations, policies, informal rules and so on. They are more general formal and informal rules mediating interactions. Institutional arrangements, on the other hand, are governance structures, formalized agreements, and contractual agreements between specific actors.

In this study, one part of institutional arrangement, that is, contractual agreement was examined. Two alternative institutional arrangements (contractual arrangements) for milk marketing were observed next to the default non-contract option (spot market). The first alternative was using formal contractual agreement, while the other alternative was using informal contractual agreement. Based on these arrangements, the institutional arrangements were examined especially in terms of the transaction costs associated with marketing and being exposure of the formal and informal contractual agreement user producers to default of contractual agreement.

In the institutional environment part of this section, how the laws or regulations, enforcement mechanisms, and informal norms such as trust were related with milk marketing was examined.

4.2.1 Institutional Environment

4.2.1.1 Formal institutions in dairy marketing

Even if formal rules such as laws, regulations, and directives/principles are important in any marketing including dairy marketing, there are no as such formal rules at regional level as well as at national level regarding dairy marketing. The only proclamation regarding livestock is the “Live Animals Marketing Proclamation No.819/2014” issued on 26th day of March, 2014 by the government of the Federal Democratic Republic of Ethiopia (FDRE). This proclamation was focused on selling, buying, and transporting of live animals, feedlot

letting and other marketing related activities. The live animals included in the proclamation were cattle, sheep, goat, camel and other animals to be designated as such by the Ministry of Agriculture. The other proclamation which has little relation with milk is the “Cooperative Societies Proclamation No. 147/1998” issued on 29th day of December, 1998. This cooperative proclamation includes the establishment of milk cooperatives but it did not say about dairy marketing. Following the proclamation of cooperative Societies of the FDRE, the ANRS had issued Milk Development Cooperative Proclamation No.6/2014 in 2014.

Due to the lack of such proclamations, regulations and principles/directives, the dairy marketing in the study area was carried out in a traditional way (traditional processing and lacks modern standards). The lack of important rules with regards to a standard dairy marketing system and transaction safeguards lead to many complains by dairy marketing actors blaming for each other especially in weighing/measuring scales and quality standards. There were no regulations in dairy marketing concerning quality standards, weighing scales and container types (except in the cooperatives and milk processors which have lactometer that is used to test the adulteration of milk with water). The butter traders sell butter in shops that did not fulfill quality requirements for food stuffs starting from neatness to packaging materials or containers. The traders complained that the tax or revenue authority simply focuses on tax collection but it ignores creating favorable conditions for safety places for selling butter and related goods.

Lacks of well-functioning legal systems affect the agreement between buyers and sellers. The enforcement mechanisms for breaching of contracts were weak and due to this, most of the conflicts caused by this default were resolved by negotiation. For instance, among the dairy producers who were faced with default in contractual agreement, 82% of them resolved the default conflicts by negotiation whereas only 14% and 4% of the default were resolved by going to courts and by social courts. Among the dairy producers that were faced by defaults in contractual agreement and resolved by court, 43% of them were not satisfied with the legal enforcement mechanism taken to correct the breach.

The responsible bodies for enforcement of laws/by-laws and regulations such as default in contractual arrangement between producers and milk buyers in the study area were the dairy cooperatives, the local community and the government. The cooperatives have their own by-laws that set rules such as requirements necessary for membership, the rights and

responsibilities/duties of the members, and conditions for withdrawal and dismissal from memberships. The members of the cooperative shall respect the by-laws, directives and decisions of the cooperative but if the member failed to do so, he/she would be punished (the punishment goes up to dismissal from the membership).

Even if there is no special regulation regarding dairy marketing, governmental legal courts were also responsible for conflicts resolutions in trading such as default in formal contractual arrangements between contracted parties if the contracted parties failed to resolve the conflicts and if they go to legal courts. The court sees the default in dairy marketing as any breaking of contracts in trading.

In general, the formal institutional environment in dairy marketing was in its inadequacy in several ways. The legal conflict resolving mechanisms such as rules that prevent opportunistic behavior from both sides of exchanges were lacking except in the cooperative laws and by-laws. There were no special rules or regulations regarding dairy marketing in the study area as a particular and in the region and in the country as a general.

4.2.1.2 Informal institutions in dairy marketing

Because of the lack of formal rules and regulations and enforcement mechanisms in dairy marketing, using informal institutions such as trust and strengthening personal relations were important to secure the trading environment. Trust was the dominant informal institution that governs the exchange of dairy product in the study area. Trust plays crucial role in the relationship between trading partners by increasing the cooperation and produce mutual benefits. Trust is regarded as an important asset in an exchange relationship among actors in the dairy marketing. Trust is considered as a self-enforcement mechanism in informal contractual arrangements.

Out of the total sample dairy producers who participate in milk marketing, 98 (80.99%) of them have reported that they have trust on their buyers. Trust among the dairy actors especially between the producers and the buyers can be expressed in many ways. One way can be observed in their payment for milk sale based on their agreement. In all of the non-contract, formal contract and informal contractual agreements, delay in payment up on the specified time was observed. The trading partners' mode of payment such as weekly or monthly bases for payment was based on the agreed time of payment. As it can be observed from the table below (Table 19), the chi-square test comparison showed

significant difference in delayed payment at 10% significance level among the non-contract, formal contract and informal contractual marketing arrangements. Among these three marketing arrangement forms, non-contract marketing has the lowest delayed payment (9.09%) than the other marketing arrangements. The next market arrangement which has lower delayed in payment was the informal contractual agreement (31.82%). Even though there were binding agreements in the formal contract, it has the largest proportion (59.09%) of delayed payment. This result was an indication of how trust played role in keeping the agreement between the trading partners and creating smooth running transacting processes.

Table 19. Delaying in payment for milk sale based on contract marketing arrangements

Whether there is delayed payment from milk buyer		Contractual arrangements			Total	Chi ² -value
		Non-contract	Formal Agreement	Informal Agreement		
Yes	N	6	39	21	66	4.638*
	%	35.3	62.9	50.0	54.5	
No	N	11	23	21	55	
	%	64.7	37.1	50.0	45.5	

Source: Own survey result, 2016, *significant at 10% significance level.

4.2.2 Institutional Arrangements

Before proceeding to the two alternative institutional arrangements in dairy marketing in the study area, the non-contracts (Spot markets) have to be examined.

Spot Markets: Spot market serves as the default option for producers in milk marketing in the study area. Out of the total sample dairy producers who sell milk, 17 (14.05%) of them were found to use spot market (non-contract) as their default option to sell their milk. In this spot market, 12.24% of the total volume of milk was sold. Respondents in the non-contract (spot market) sold their milk to consumers, traders, cafeterias, restaurant, and hotels. The transaction of milk took place without any formal or informal contractual agreements. Trust played an important role in transaction of milk as the spot market was characterized by absence or weakness of formal institutional environments. The spot markets function in the absence of formal rules of institutional environments in cases when conflict happens. From the total dairy producers participated in non-contract /or spot market, 94.1% of them have reported that they have trust on their buyers while 87.1% and 66.7% of the formal and informal contractual agreement user respondents reported that

they did not have trust on their buyers respectively. Thus, it can be understood that trust was important in spot market in the study area.

The study has revealed that all (100%) of the dairy producers who sold their milk in spot market found their trading partners physically without any other market linking agents. About 64.71% of the price setting was done by negotiation between the trading partners and the rest was done either by the seller or by the buyer. In this default option of marketing, 76.47% of the dairy producers sold their milk individually. About 35.3% of the payment for their milk sale was done by immediate cash payment and this was greater as compared to formal and informal agreements which were 0.0% and 7.1% respectively. The rest of mode of payments for the spot market was done on monthly and weekly bases.

4.2.2.1 Formal contractual arrangement

This form of contractual arrangement was practiced by 62 (51.24%) of the total sample dairy producer households who sold milk. This form of contractual arrangement was based on formal type of contract and has acceptance in courts if there is any default up on the agreed marketing agreements. About 36.5% of the terms of agreement was based on quality of milk while the rest was focused on price, volume, and all volume, price, and quality together. The agreement period for most of the formal contract users were found to be one and greater than one lactation period. Most of the dairy producers who used formal contractual agreement were found to sell their milk to milk cooperatives/milk processors. They also sold to cafeterias, restaurants, hotels and to consumers, and traders. Unlike spot (non-contract), the governing factor in the formal contractual agreement was the binding force in the legal document. In case when breaching is occurred, the conflict is resolved by legal court.

It was found that about 66.24% of the total volume of milk marketed was transacted through the formal contractual arrangement in the sampled respondents. The study has showed that 59.7% of the contractual user dairy producers sold their milk in group whereas the rest 40.3% sold their milk individually. The practice of selling in group has an advantage in reducing transportation cost due to economies of scale and this made them to incur less transportation cost than the informal contractual arrangement users. A chi-square comparison statistical test showed a significant difference at 1% significance level in setting of the selling price among the contractual arrangements. In the formal contractual arrangement of selling milk, 85.5% of the price was set by negotiation and the rest was set

by the decision of buyers only. A chi-square test comparison showed significant difference at 1% significance level in mode of payment among the non-contract, formal contract, and informal contract users. In the formal contractual arrangement, 100% of the payment was done on monthly bases. This monthly payment was based on the agreement at the starting time of the contract.

4.2.2.2 Informal contractual arrangements

The informal contractual arrangement was practiced by 34.71% of the total sample dairy producer who sold milk. This contractual agreement was based on mutual understanding (oral) and the governing factor in this arrangement was the informal type of institution, that is, trust. For the exchange arrangement to be well functioned for both actors (that is, sellers and buyers), trust serves as a good social bondage for both parties and this enhances the success and sustainability of milk marketing.

The dairy producer households those use the informal contractual arrangement sold their milk mostly to consumers. They also sold to cafeterias/restaurants/hotels, and cooperatives/processors. It was found that about 21.52% of the total volume of milk sold was transacted through the informal type of contractual arrangement. Out of the total informal contractual arrangement users, 88.1% of them receive their payment of milk sale on monthly bases whereas 7.1% of the payment was made on immediate cash. The setting price in this type of arrangement was mostly (61.9%) done by negotiation and by dairy producers (26.2%). The other price setters were milk buyers. The study has revealed that 90.5% of the dairy producers who used the informal contractual arrangement found their buyer partners themselves, not by any agent or organization, and this was an indication of the lack of marketing linkages in dairy marketing in the area. As compared to the formal contractual arrangement, most (66.7%) of the dairy producers in this type of informal contractual arrangement sold their milk individually.

Table 20 summarizes the availability of knowledge on legal enforcement mechanisms in case when breaking contractual agreement is faced. Among the dairy producer households, who used spot markets for their milk sell, 8 (47.1%) of them had no knowledge on legal enforcement mechanisms in case when breaking contractual agreement are faced while the rest 9 (52.9%) had knowledge on legal enforcement mechanisms, In the Formal and informal contractual arrangements, the respondents who had knowledge on legal enforcement mechanisms in case when breaking contractual agreement were 72.6% and

33.3% respectively. As it is observed from the table (Table 20), there was significant difference at 1% significance level in availability of knowledge on legal enforcement mechanisms when breaking contractual agreement was faced among the different institutional arrangements.

Table 20. Knowledge of dairy producers on legal enforcement mechanisms

Knowledge on legal enforcement mechanisms in breaking contractual agreement		Institutional arrangements used			Total	Chi2-value
		Non-contract	Formal Agreement	Informal Agreement		
No	N	8	17	28	53	15.75***
	%	47.1	27.4	66.7	43.8	
Yes	N	9	45	14	69	
	%	52.9	72.6	33.3	56.2	

Source: Own survey result, 2016, *** Significant at 1% significance level.

The F-test showed statistical difference at 1% significance level in volume of milk marketed per day through the non-contract, informal, and formal contractual arrangements (Table 21). The highest mean (that is, 9.76 liters per day) was marketed through the formal contractual arrangement while the lowest mean (4.68 liters per day) was transacted through the informal arrangements.

Table 21. Volume of milk marketed by contractual arrangements

Variable	Contractual arrangements						Total		F-Value
	Non-contract		Formal agreement		Informal agreement				
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	
Volume of milk marketed per day	6.58	9.16	9.76	6.87	4.68	5.34	7.55	7.11	7.27***

Source: Own computation from survey, 2016, *** Significant at 1% significance level.

Table 22 summarizes the transaction and transportation costs by the institutional arrangements in the study area. The non-contract, formal contract, and informal contract users spend on average 0.15, 0.09, and 0.16 Birr per liter respectively for transaction costs associated with milk marketing. Even though there was no statistical difference in transaction cost among the non-contract, formal and informal contractual arrangement users, informal contractual arrangement users seem to incur more costs than formal and non-contract users. The mean transport cost spent by the non-contract users, formal

contractual agreement users and informal contractual users was 0.08, 0.04, and 0.29 Birr/liter of milk respectively. There is a significant statistical difference at 1% significance level among the three contractual arrangement users in transport cost. As it is indicated from the table (Table 22), the transport cost for informal contractual arrangement users is higher than the other contractual arrangement users. Among the three contractual arrangement users, the formal contractual arrangement users incur smallest transportation cost than the others. This may indicate that how the formal contractual arrangements reduce such costs in marketing than the other arrangements.

Table 22. Transaction and transport costs for milk by contractual arrangements (Birr/liter)

Variable	Non-contract (N=17)		Formal contract (N=62)		Informal contract (N=42)		F-value	Total	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.		Mean	Std. dev.
Transaction cost	0.15	0.38	0.09	0.41	0.16	0.42	0.37	0.12	0.41
Transport cost	0.08	0.12	0.04	0.17	0.29	0.46	8.65***	0.13	0.32

Source: Own computation from survey, 2016, *** Significant at 1% significance level.

Table 23 describes average price of milk among the formal contract, informal contract and non-contract users. The f-test comparison among the non-users, formal contract users and informal contract users showed statistically significant difference at 1% significance level in average selling price per liter. The non-contract users sold at a mean price of 10.06 Birr per liter. In the formal and informal contractual arrangement, the mean selling price of milk was 8.90 and 10.38 Birr per liter respectively. It can be observed that the highest mean price was recorded on the informal contractual agreement and this might be because there were no any additional costs to be incurred to make the contract formalized because they were agreed on mutual understanding. Because of this reason, the price of milk was higher in this informal contractual arrangement. In the formal contractual arrangements additional costs were incurred to make the agreement formal and these costs must have been reduced from the milk price given to the milk sellers hence this caused reduction in milk price. Besides this, the two contracted parties share the risk of price fluctuation that could be happen by reducing the price of milk.

Table 23. Average price of milk based on contractual arrangements (Birr/liter)

Variable	Non-contract (N=17)		Formal contract (N=62)		Informal contract (N=42)		F-value	Total	
	Mean	St.dev	Mean	St.dev	Mean	St.dev		Mean	St.dev.
Average price of milk in the survey year	10.06	2.23	8.90	1.12	10.38	2.38	9.12***	9.57	1.93

Source: Own computation from survey, 2016, *** Significant at 1% significance level.

Table 24 summarizes the default of contractual arrangements in the sample dairy producer households who sold milk in formal or informal contractual bases. A chi-square test comparison with 10% level of probability showed a significant difference in default of contractual agreement between the formal and informal contractual arrangements. Out of the total formal agreement users, 40.3% of them were exposed to default, where as 59.5% of the informal agreement users were exposed to breaching of contractual agreements. This implies that default in contractual arrangement declines as the dairy producer households tend to use formal agreement in milk marketing because the formal agreement has binding agreement. There is no legal binding force in the informal agreement but the only binding force is trust and has no acceptance in courts in cases when breaking of agreement is occurred.

Table 24. Default of contractual agreement by contractual arrangements

Default of contractual agreement with buyers		Contractual arrangements		Total	Chi2-value
		Formal Agreement	Informal Agreement		
No	N	37	17	54	3.698*
	%	59.7	40.5	51.9	
Yes	N	25	25	50	
	%	40.3	59.5	48.1	

Source: own survey computation, 2016, *represents level of significance at 10%.

4.3 Value Chain Map of Milk and Butter

Value chain mapping identifies the different actors involved in milk marketing and helps to understand their roles and linkages. Based on these, the types of actors in dairy marketing and their roles; and the types of institutions and their roles and responsibilities and

regulations that regulate those roles are analyzed and mapped. The main chain in the dairy marketing was input supply, production of dairy products, marketing of dairy products, and finally consumption of end products (Figure 3).

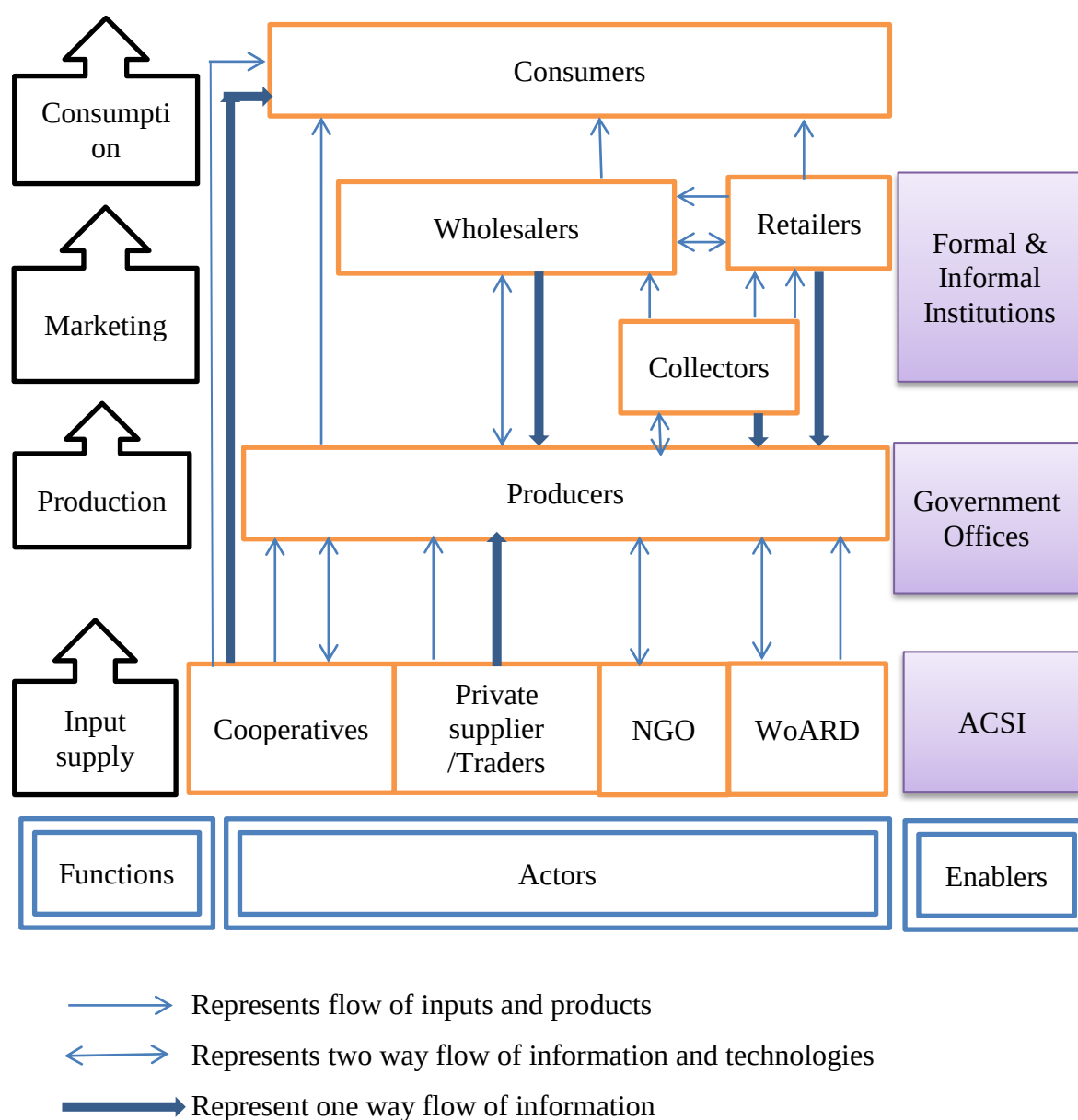


Figure 3. Value chain map of dairy marketing

Source: Own sketch from survey result, 2016.

4.4 Actors and their role in Dairy Marketing

Dairy marketing actors in this paper refers to those involved in producing, processing, trading, consuming a milk and butter. These actors are called direct actors and include input suppliers, producers, cooperatives, traders, and consumers. These direct actors involve in commercial (selling and buying activities). There are also other indirect actors called supportive institutions or organizations which include credit institutions,

government, NGOs, research and extension agents. These supportive institutions provide financial or non-financial supporting services such as training to the direct actors in the marketing chain.

4.4.1 Direct Actors

The direct actors in dairy marketing in the study area include input suppliers, dairy producer, traders, cooperatives/processors, cafeteria/restaurants/hotels, and end consumers. These actors perform different activities such as dairy production, supplying feed and improved breed, veterinary services and medicines, buying and selling of milk and milk products such as butter, and consume the dairy products.

4.4.1.1 Input suppliers

The major input suppliers identified in the study area were government, traders, cooperatives, and other farmers. The government, traders and the cooperative account for about 80.7% of the total input supply (Table 25). The government supports in input supply such as improved forages and improved dairy cow breeds through the district office of agriculture. The government also involved in provision of veterinary services through the experts hired in each district. These veterinarians serve both in provision of services and medicines to the dairy producers found in districts.

Private traders participate in input supply such as feed and veterinary medicines. They sold feeds either in open market during marketing days of the week or in their stores. Veterinary medicine was sold in private veterinary drug vendors.

Dairy cooperatives (but not all) supply feed such as wheat bran and oil seed cakes to their members. Farmers in the study area were also participated in provision of improved forage and improved cow breeds to dairy producers in the study area. These supplier farmers maintain improved forages and dairy breed and sold or give bull service to other farmers in their locality.

Table 25. Source of input (such as feed/breed) for the sample dairy produces

Description	N	%
Trader and Government	59	36.9
Government	32	20.0
Traders	31	19.4
Cooperatives	7	4.4
Open Market	6	3.8
Cooperative and Government	6	3.8
Agricultural research Center	5	3.1
Other farmers	4	2.5
Cooperative and trader	4	2.5
Do not use feed and breed	2	1.3
Neighbors	1	0.6
Other farmers and government	1	0.6
Other farmer and trader	1	0.6
Youth association and government	1	0.6
Total	160	100.0

Source: Own computation from survey result, 2016.

Similarly, the group discussion held with the dairy producers has also proved that 40%, 42%, and 18% of forage seed was supplied by the government, other farmers, and private traders respectively. In addition to this, the group discussion also reported that 83% and 17% of the agro-industrial by product feeds such as wheat bran and oil seed cake was supplied by private traders and cooperatives respectively. Improved cow bred was also supplied by private traders, government, and other farmers either through Artificial insemination (AI) or in kind. According to group discussion with dairy producers, 46%, 52%, and 2% of improved cow breeds were supplied to dairy producers in the study area by private suppliers, government, and other farmers respectively.

4.4.1.2 Dairy producers

Dairy producers were the major actors in the study area who perform most of the chain functions in the dairy production and marketing. They perform procurement of inputs from source to their farm or home, produce or raise dairy cows, perform milking, processing, transporting milk and other milk products to selling destinations, and finally selling their products to either of the buyers. The dairy producers bought inputs from different sellers either from open markets or from stores and delivers to the required area.

The sample dairy producers in the study area practice traditional way of milking that is, they use manual (hand) milking and due to this traditional way of milking, spoilage of milk was common in the area. Out of the total sample respondents who were faced with spoilage of milk, 44.4% of them have reported that the major reason for their milk spoilage was due to poor hygiene during milking and poor containers. The second cause of milk spoilage, which was reported by 18.52% of the sample respondents, was breaching of contracts with their buyers. Cow disease (which was reported by 11.11% of the dairy producers) was also another important reason for spoilage of milk next to breaching of contracts. The other causes for spoilage of milk include hot weather condition, lack of buyers during fasting periods, delayed delivery to milk buyers, and the like. The milk cooperatives (except Bahir Dar Dairy Development Cooperative which receive milk twice a day), receive milk only once per day and this was another problem for the spoilage of milk. The dairy producers either consume or process the unsold milk in to different products such as yoghurt, butter, and local cheese. According to the respondents, a total of about 3153.06 liters of milk estimated at price of about 31613.76 ETB was spoiled during the last 12 months of the survey year.

4.4.1.3 Traders

A total of 30 traders were used for the study purpose in which 20 (66.67%) of them were female traders and 10 (33.33%) of them were male traders. The mean education status of the traders measured in years of schooling was 7.90 with a standard deviation of 5.15. The f-test showed that there exists statistically significant difference at 5% significance level in education status among the trader types (Table 26). As it is observed from the table, wholesaler traders were more educated than the other traders and village traders were with lower level of education status than the others and this might imply that education is more important in higher level of trading such as wholesaling as it was more complex than simple trading such as collecting at village level or retailing.

Table 26. Education status by type of traders.

Description	Wholesaler (N=4)		Retailer (N=19)		Village trader (N=7)		F- value	Total (N=30)	
	Mean	St.dev.	Mean	St.dev.	Mean	St.dev.		Mean	St.dev.
Education status in years of schooling	10.25	4.79	9.16	4.73	3.14	3.80	5.09**	7.9	5.15

Source: Own computation from survey, 2016, ** Significant at 5% significance level.

The sample traders have mean age of 34.43 with a standard deviation of 11.84. But the F-test comparison showed no statistical difference among the trader types. The sample traders had an average of 7.31years of dairy trading experience. Even if village traders appeared to have more trading experience than the other traders, the f-test comparison showed no statistically significant difference among the three trader types (Table 27).

Table 27. Demographic characteristics of traders

Description	Wholesaler (N=4)		Retailer (N=19)		Village trader (N=7)		F- value	Total (N=30)	
	Mean	St.dev	Mean	St.dev.	Mean	St.dev.		Mean	St.dev.
Age of the respondent in years	32.75	10.18	33.63	12.32	37.57	12.45	0.31	34.43	11.84
Household size	4.00	0.82	3.32	2.24	3.29	0.95	0.23	3.40	1.85
Years in dairy trading	6.50	5.07	6.86	7.03	9.00	5.92	0.30	7.31	6.44

Source: Own computation from survey, 2016.

Capital is the key factor to start any business activities such as trading businesses. The sample traders had different source of capital during their start of trading. Among the trader, 11 (36.7%) of them had own source of capital for starting the business. Credit/loan was also used as a source of capital and was used by 8 (26.7%) of the traders. The other sources for initial capital were relatives, friends and gifts. However, there was no statistical difference in initial amount of capital among the trader types but statistical difference at 10% significance level was observed in current capital among the trader types. The mean current capital for retailer traders was 29921.6 ETB whereas the current

capital for wholesalers and village traders was 5825 and 3342.86 ETB respectively (Table 28).

Table 28. Initial and current capital by trader types

Capital	Wholesaler (N=4)		Retailer (N=19)		Village trader (N=7)		F-value	Total (N=30)	
	Mean	St.dev	Mean	St.dev.	Mean	St.dev		Mean	St.dev.
Initial capital	2012.5	2144.9	5060.9	11355.2	117.3	107.9	0.78	3500.9	9228.9
Current capital	5825	6412.7	29921.6	33799.2	3342.9	2270.7	3.00*	20507.0	29551.7

Source: Own computation from survey, 2016, * Significant at 10% significance level

The sample traders were mainly involved in buying and selling of milk and butter and also involved in supplying inputs to dairy producers. The traders buy milk and butter from different sources and sold it to processors, cafeterias, hotels and consumers found in their districts and Bahir Dar city. They collect milk directly from dairy producers, from other village traders or (village collectors), and from farmers' milk cooperatives. Among the surveyed traders, 20 (66.7%) of them were butter traders, 8 (26.7) of them were milk traders and the rest 2 (6.7) of them were both milk and butter traders. Out of the total sample traders, 19 (63.35), 7 (23.3%) and 4 (13.3) of them were retailers, village collectors and wholesalers respectively. The village traders (village collectors) go to villages and buy milk or butter either from producers or from milk cooperatives and sell these produce to traders (wholesalers or retailers), cafeterias, restaurants or consumers. The wholesalers were found in Bahir Dar City and buy from producers or from village traders and resell the produce to retailers, cafeterias, restaurants, hotels, and to consumers. The retailers which account majority of the traders were engaged in selling of milk and butter to end consumers.

Most of the traders especially butter traders complained about the poor quality of butter. They explained that the quality of butter was declining from time to time and the main reason, according to these traders, was the type of feed the dairy cows feed because nowadays the cows, most of the time, fed on industrial feeds as compared to the previous times that fed on natural forages such as natural grazing lands. This issue was also raised by some dairy producers. Most of the sample traders (66.7%) have reported enough supply

of milk and butter from the suppliers regardless of its quality but the rest 33.3% of them have reported shortage of supply of milk and butter.

The mode of payment for milk and butter purchase was most of the time in cash. Payment per month and per week and every two weeks was also practiced by some milk and butter traders and this was based on the agreement of the suppliers and the traders. Most of the traders had contractual agreement (mostly verbal agreement based on trust and mutual understanding) with their milk and butter suppliers. This was also an indication of the role of trust in dairy marketing between the traders and the suppliers of dairy products in the study area. Of the total traders, 53.3%, 36.7%, and 3.3% of them reported that they have high, moderate, and low trust on their suppliers respectively while only 6.7% percent of them had reported that they have no trust on their suppliers (Table 29). In most cases, the price was set by negotiation between the suppliers and the buyers but few traders have reported that price was also set only by the suppliers.

Table 29. Trust the traders has on milk and butter suppliers

Description	N	%
No trust	2	6.7
Low	1	3.3
Moderate	11	36.7
High	16	53.3
Total	30	100.0

Source: Own survey result, 2016.

The traders sold milk and butter to any buyer either in their district open markets or selling shops or transported it to Bahir Dar city and sold it to cafeterias, restaurants, hotels, and consumers. Consumers account about 60% of the total buyers in buying milk and butter from the traders. Butter traders also sell butter directly to other traders that in turn sell the butter to other traders and retailers in areas outside the region such as Addis Ababa. The traders sold milk and butter to their buyers mainly on cash basis and on monthly and also on weekly basis. They have verbal type of contractual agreement with their buyers which was based on mutual understanding and trust plays key role in this trading processes. Among the traders sampled for the study, only 4(13.3%) of them had faced breaching of contractual agreement and these default has been resolved by negotiation and it was found that all the trading partners were satisfied with the resolving mechanism. This implies that

there was smooth trade relationship among the trading partners. Spot market was the next type of arrangement practiced in milk and butter trading.

Few traders provide services such as consultation, material/utensils, hygiene, and credit services to milk/butter suppliers. Packaging material is among the necessary conditions to keep the product from different risks such as physical risks and contaminations. The sample traders used plastic made containers to contain milk and paper boxes and plastic materials as packaging material for butter. None of the traders had any additional selling branches either in their districts or outside the district. Out of the sample traders, only 4 (13.3%) have their own means of transport and among these, 3 of them owned bicycle and one trader owned Bajaj (three wheel motor vehicle).

Most (90%) of the traders were found to have access to credit. According to the sample traders, the main sources of credit they used during the last 12 months were microfinance (ACSI), relatives, friends and NGOs. They got credit through collateral (such as houses and salary), and through group formation.

High tax rate was the major constraint for traders in the dairy marketing. Institutional impediments were also mentioned as barriers to smooth dairy trading in the study area among which infrastructure (such as road, telecom service, and electricity), poor or lack of government policy concerning dairy trading, and lack of permanent selling place were the major ones.

The study showed that there was no enough support given to milk and butter traders concerning dairy business. Only 5 (16.7%) of the traders did obtain support (such as training, credit/loan) from different bodies such as NGOs, trader organizations/trade unions, and from personal relations such as friends and families. But majority (83.3%) of the traders did not found any support regarding their dairy trading.

Most (63.3%) of the sampled traders have license and the rest 11(36.7%) of them were not registered (have no license). The registered traders complained about the unfair competition between the registered and the unregistered traders in that the competition was difficult due to the fact that they have to sell in higher prices than the unregistered traders in order to cover their tax fees. But since the buyers need low prices (provided that the quality is the same), they prefer to buy from unregistered traders who sell with relatively

lower prices. Thus, this forced the licensed traders to reduce prices and this led to lower incentives than their counterparts.

4.4.1.4 Consumers

Consumers are the end users of agricultural or industrial products in any economy. Consumers purchase the product for final consumption. In the context of this study, consumers represent individuals who buy and consume milk and/or milk products for themselves and their family. A total of 27 sample consumers of milk were used for the study purpose. Of these consumers, 15 (55.6%) were female consumers while the rest 12 (44.4%) were male consumers. They have mean age of 32.11 years with a standard deviation of 7.38. The family size of the sample consumers ranges from a minimum of 2 to a maximum of 10 with a mean of 4.33 units.

On average, the consumer households consume 0.97 liters of milk per day and this was about 29 liters of milk per month. The sample consumers spent about 342 ETB per month for milk consumption and this was about 10% of the average monthly income (which was about 3434 ETB per month) of the consumers. The average price of milk that consumer households bought was 11.8 ETB per liter. Among the sample consumers, 21, 4, and 6, of them consume butter, yoghurt, and cheese and spend an average of 139.9, 13.36, and 18.6 ETB per month on these products respectively.

Milk was consumed by children and all family members. Out of the total sample consumers, 15(55.6%) of them reported that milk was consumed only by children while the rest 12 (44.4%) have mentioned that all the family members consumed milk in the household. About 96.3% of the sample respondents buy usually raw fresh milk for consumption but consume boiled milk mostly because of health issues, their freshness, and cleanliness. The rest consumers usually buy powdered milk. Majority (77.8%) of the consumers did obtain enough amount of milk they demanded and the rest 22.2% were faced with shortage of milk supply. Of the total sample consumers, 17 (63.0%) of them bought milk from producers and the rest 9 (33.3%) and 1(3.7%) bought from cooperatives and village collectors (village traders) respectively (Table 30).

Table 30. Source of milk supply for consumers

Supplier type	N	%
Producer	17	63.0
Village collector (Village traders)	1	3.7
Cooperative	9	33.3
Total	27	100.0

Source: Computation from own survey, 2016.

Most (77.8%) of them also bought butter for consumption from wholesalers, retailers, village collectors and directly from producers. Some individual consumers also bought yoghurt and cheese from cooperatives.

About 81.5% of the milk consumers practiced contractual agreement with milk suppliers. The nature of contractual agreement was mostly informal agreement (practiced by 63% of the consumers) which was based on mutual understanding. Formal (written) agreement was also used by 18.5% of the consumers. The rest 18.5% of the consumers did not use contractual agreement for buying milk but simply exchange in daily bases. Of the contractual agreement users, 9 (33.3%) of them reported that there was breaching of contractual agreement which was mainly on volume of supply, on agreed quality, and on agreed prices. The responsible bodies for breaching of contract, according to the consumers were the producers, cooperative and sometimes both sellers and consumers. No action was taken to correct the breaching of contracts (except one penalty on the contract breaker using informal rule) and this indicates lack of effective enforcement mechanisms to correct the breaching of contracts.

The sample consumers have reported that there were many institutional problems /impediments regarding dairy marketing. Among the major institutional impediments were absence or shortage of legal protection in case of cheating on prices and weighing scales, input supply problems, absence of quality controlling agent, poor infrastructures (such as road, telecommunication, and electricity), and poor focus from government.

According to the consumers, price of milk was set mostly by the sellers (suppliers) and also sometimes by negotiation. Mode of payment for milk purchase was mostly made on monthly bases. Weekly and immediate cash payment was also practiced by the consumers based on the agreement.

About 74.1% of the respondents have reported the existence of weak relationship between them and their suppliers. The rest 14.8% and 11.1% of consumers reported that there exists moderate and good relationship with their suppliers respectively. The consumers' criterion for selecting their suppliers was mainly quality of product, nearness to their home, reliable (consistent) supply, and trust (loyalty).

4.4.1.5 Milk Cooperatives/Milk processors

The sample dairy cooperatives in the study area (Appendix Table 15) collect milk from their members based on the quantity of milk produced by each member. They serve as a linkage between dairy producers and buyers. They play significant role in procurement, processing and marketing of milk. They also increase the bargaining power of dairy producers, increase the supply of quality milk, supply inputs such as feed at lower price to member dairy producers, supply veterinary medicines, and provide services such as training and credit to members.

Two of the sampled cooperatives (Addis Alem Milk Cooperative and Abay Zuria Milk Cooperative) receive milk only once per day during morning time and the other cooperative (Bahir Dar Dairy Development Cooperative) receive milk twice a day from 6:00-7:00 AM and 2:00-3:00 PM. Addis Alem Milk Cooperative (The cooperative found in Hulet Yigoma) kebele collect milk at every morning and transport the milk to supply for processors by renting Bajaj. Abay Zuria Milk Cooperative (found in Sebat Amit kebele) collects milk once a day at the morning and transports it and supplies to two processors and other cafeterias found in Bahir Dar City using its own Baja.

Addis Alem Milk Cooperative, Abay Zuria Milk Cooperative, and Bahir Dar Dairy Development Cooperatives have maximum receiving capacity of 1000, 4000, and 4000 liters per day respectively. But due to shortage of supply and demand fluctuation especially during fasting periods, currently they receive on average 160, 614, and 2400 liters of milk per day respectively. The cooperatives received milk by checking its quality using lactometer and if the quality is low, they returned it back. Addis Alem Milk Cooperative provides only training to its members. But the other cooperative provide training, consultation/advice, milk containers, and feed (on credit). Addis Alem Milk Cooperative doesn't process milk to different products due to lack of processing equipment but collect and sell raw milk to processors found in Bahir Dar City. Abay Zuria Milk Cooperative was comparatively better than Addis Alem Milk Cooperative because it processes the unsold

milk to butter and *Ayib* (local cheese). It sells the milk to processors and cafeterias in Bahir Dar City. Bahir Dar Dairy Development Cooperative (found in Bahir Dar City in kebele 13) processes and sells different products such as milk, butter, *ayib*, and yoghurt and sells to consumers, cafeteria/restaurants/hotels, processors, hospitals, factories, and traders (retailers). This cooperative has eleven selling shops in different locations of the City and sells its products at fixed selling hours (8:00-9:00AM and 2:00-3:00PM).

Out of the sample cooperatives, Bahir Dar Dairy Development Cooperative obtained support from different NGOs and government such as Agricultural Growth Programme-Livestock Market Development (AGP-LMD), Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance (ACDI/VOCA), Finnish Agricultural Agency for Food and Forest Development (FAFFD). The other cooperatives didn't have enough support except from ACDI/VOCA which is focused on supplying of processing equipment. However according to the experts in each cooperative, the cooperatives didn't obtain enough support such as capacity building and financing.

Milk processors collect milk from dairy producers and cooperatives and process it to different products such as cooking butter, table butter, cosmetic butter, cheese, yoghurt, and local cheese (*Ayib*). The sample processors have the capacity of processing up to 2575 liters of milk per day but they collect and process 1630 liters of milk per day due to shortage and low quality of milk. The processors buy 80.4% of raw milk from cooperatives and 19.6 % from producers. Two of the processors (Emebet and Sons and Sora Dairy processor) receive milk twice per day whereas Tsige milk processing plant receives only once per day in the morning.. Emebet and Sons, Tsige, and Sora Milk Processing Plants have a total of 15, 4, and 8 employees respectively. These processors have formal and informal contractual agreements with their suppliers focused on quality, price, and volume of milk. All the processors provide training and advices services to their suppliers related to milk quality. Emebet and Sons Milk Processing plant also provides materials/utensils to milk suppliers indirectly through the cooperatives.

The processors sell their products to different agents such as consumers, hotels, super markets, wholesalers and retailers in the survey year. Emebet and Sons Milk Processing Plant sell cheese to wholesalers (40%) and Hotels (60%). Sora Milk processor sold cheese to Retailers (21.88%), Hotels (21.88%), and Super Markets (56.25%). Sora Milk processor also sold 35.7%, 35.7%, and 28.6% of its butter to consumers, retailers, and

hotels respectively. It also sold its yoghurt to Consumers (56%) and super markets (44%). Tsige Milk Processor sold 75% and 25% of its butter to consumers and hotels respectively. It also sold local cheese (*ayib*) to consumers and retailers with a share of 75% and 25% respectively. This processor produces and sold yoghurt to consumers (100%). The dairy processors get support such as technical training and material gifts from NGOs such as LMD and purchasing of material free of tax from the government.

4.4.1.6 Cafeteria/Restaurants/Hotels

Cafeterias/restaurants/hotels were other agents that buy milk and sell to consumers. A total of 20 sample Cafeterias/restaurants/hotels were considered in the study. They buy milk from dairy producers, cooperatives, trader, and organized milk producers mostly (70%) based on informal contractual bases. Out of the total surveyed cafeterias/restaurants/hotels, 70% of them bought milk from farmer dairy producers, 5% of them buy milk from dairy cooperatives and 5% buy from both dairy producers and cooperatives. The rest 20% buy milk from traders and organized dairy producers. They bought an average of 6.15 liters of milk per day at an average price of 13.36 ETB per liter. These Cafeterias/ restaurants/hotels buy only raw milk from the suppliers. Payment for milk purchase was made on immediate cash basis, every two weeks and also on monthly basis. Breaching of contractual agreements mainly on supply of volume were occurred on 5 (25%) of the cafeterias/restaurants/hotels. The responsible parties for this breach were producers and traders. Informal actions (advice not to repeat the breaching) were taken to correct the breaching.

Even though there is shortage of supply in some seasons, most (80%) of the cafeterias/restaurants/hotels reported that there was enough supply of milk they demand. Only 20% of them had reported the existence of shortage due to low supply and low quality of milk. Of the total sample cafeterias/ restaurants/hotels, 50% of them have reported that there were complaints from the customers (consumers) on the milk they sell. These complain were on adulteration of the milk with more water, poor quality of milk, and low fat content.

Only 10% of the cafeterias/restaurants/hotels provide services such as credit and consultation about quality of milk to their suppliers. Majority (70%) of the cafeterias/restaurants/hotels, use contractual agreement (all informal agreement but one was formal agreement) with their milk suppliers to buy milk. The contractual agreement was based on quality, price and volume of milk.

4.4.2 Supportive Institutions

Supportive institutions participated in dairy marketing in the study area include credit (Micro finance) institutions, NGOs, Government (through extension agents and Research organizations).

4.4.2.1 Microfinance institution

ACSI (Amhara Credit and Saving Institution) was the major credit institution in the study area. According to the sampled respondent dairy producers who have access to credit and took credit in the last 12 months, 94.34% of them took credit from ACSI. Moreover, the group discussion conducted on dairy producers confirmed that 98% of the credit used by the dairy producers was sourced from ACSI. Similarly, out of the total traders sampled who have access and used credit in the last 12 months of the survey year, 33.33% of them were used credit from ACSI. The reason why most of the respondents used credit from ACSI was that this institution was accessible to farmers and traders than the other financial institutions such as banks. Besides its accessibility, this microfinance was easier in its bureaucratic process than banks in taking credits. Moreover, its collateral system was based on the condition of rural community and relational ties of traders (by group formation). The next sources of credit for the producers and traders were relatives and friends.

4.4.2.2 Non-Governmental Organizations

Agricultural Growth Project-Livestock Market Development (AGP-LMD) was the major non-governmental organization involved in dairy marketing in the study area. It was established and funded by the United States Agency for International Development (USAID). It mainly focuses on expanding livestock and livestock product markets for smallholder producers. The project supports processors in provision of milk processing equipment, and establishment of milk processing plants through innovative grant fund, provides capacity building training in milk & milk products, product safe handling, storage & transport, in quality standards & quality based payment, it links dairy producers with processors and input & service providers with producers. Other NGOs such as Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance (ACDI/VOCA) supports processing equipment for cooperatives.

4.4.2.3 Government

The government supports producers in different aspects through the extension agents found in kebeles. According to the sample dairy producers, these extension agents give trainings regarding production and handling, marketing information and linkage, and veterinary services. According to group discussion held with dairy producers, 46% of veterinary service was provided by the government. Government research organizations such as Andasa Agricultural Research Centre also give support to primary milk cooperative and dairy producers such as trainings on improved breeds and dairy production and handling.

4.4.2.4 Private veterinarians

According to group discussion with the dairy producers, private veterinarians were the major important supportive actors in supplying veterinary services to dairy producers. Based on the group discussion, private veterinarians provide 51% of the veterinary service in the study area.

4.5 Marketing Channel

4.5.1 Milk Marketing Channel

Based on the conducted survey results, 42.79% of the total volume of milk produced was marketed as raw milk where as 18.82% was used for home consumption. The remaining 38.39% was processed in to different products such as butter (both for cooking and for cosmetic purposes), local cheese, or yoghurt.

According to the data obtained from the dairy producer respondents, focus group discussion with dairy producers and traders, and the milk cooperatives, eight main marketing channels of milk were identified in the study area (Figure 4). In these milk marketing channels, a total of 913.55 liters of milk was marketed per day by the sample respondents in the survey districts of Bahir Dar Zuria, Bahir Dar urban, and Mecha in the survey year.

As it is observed from figure 4, the main marketing channel was producers →cooperatives →consumers. This marketing channel collected (purchased) 437.09 liters of milk per day and this accounted 47.85% of the total milk marketed by the sample producers. The second milk marketing channel was producers →consumers that accounted 19.64% of the total milk marketed. This marketing channel purchased 179.39 liters of milk per day. The third

important milk marketing channel was through producers →cooperatives →cafes/restaurants/hotels→consumers. This channel accounted 10.25% of the total milk market share.

- I. Producers → traders→café/restaurants/hotels→consumers (62.05litres = 6.78%)
- II. Producers→cafes/restaurants/hotels→consumers (47.69lt = 5.22%)
- III. Producers→consumers (179.39 liters = 19.64%)
- IV. Producers→cooperatives→café/restaurants/hotels→consumers
(93.67lit/day = 10.25%)
- V. Producers→cooperatives→consumers (437.09lit = 47.85%)
- VI. Producers→cooperatives→retailer traders→consumers (31.22lit = 3.42%)
- VII. Producers→cooperatives→health institutions/factories→consumers
(31.22lit = 3.42%)
- VIII. Producers→cooperatives→processors (31.22lit = 3.42%)

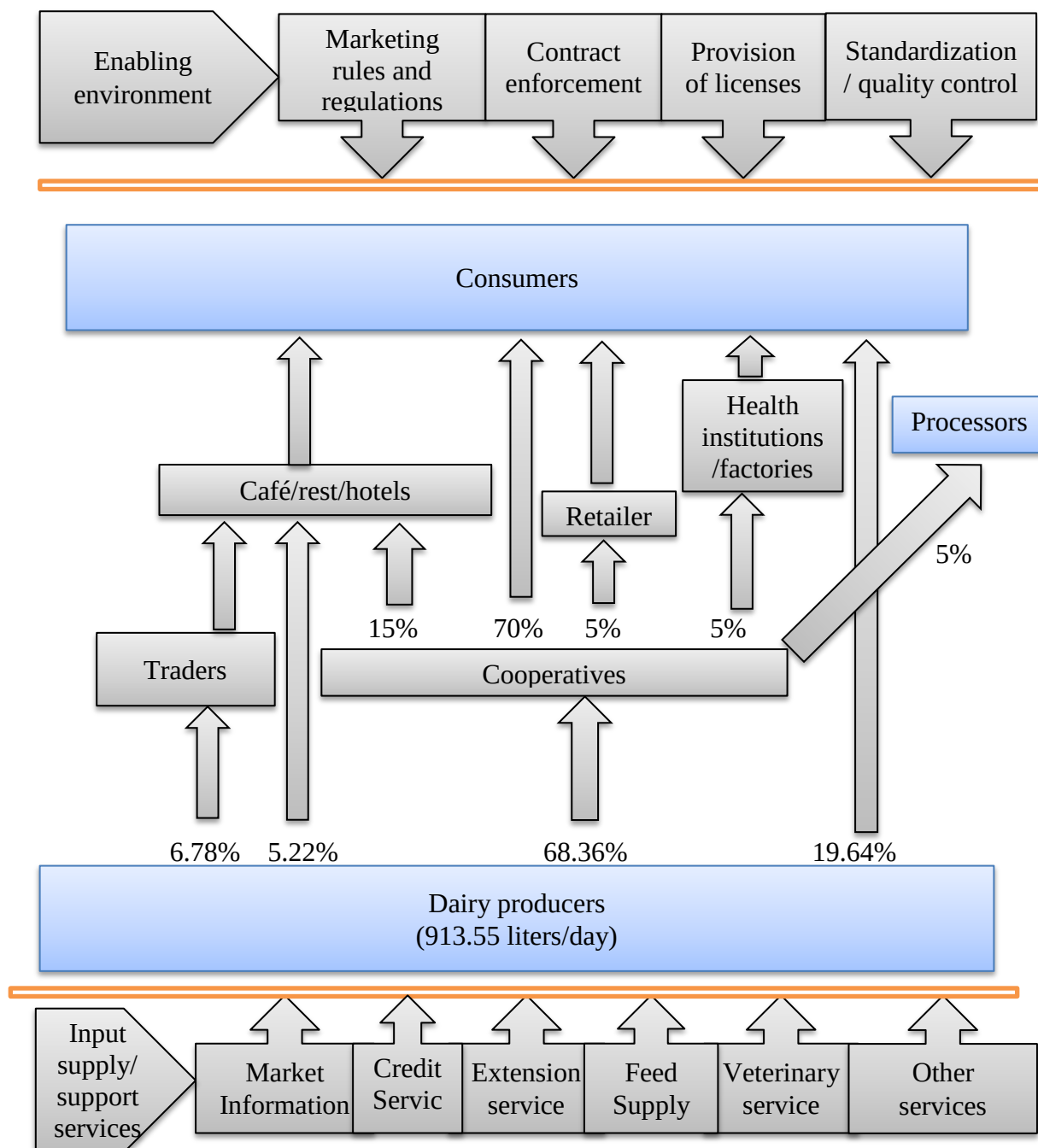


Figure 4. Milk marketing channel

Source: Own sketch from survey result, 2016.

4.5.2 Butter Marketing Channel

Ten butter marketing channels were identified in the study area (Figure 5). In these butter marketing channels, a total of 80518.2 kg of butter was marketed during the last 12 months of the survey year by the sample butter marketing actors in the survey districts of Bahir Dar Zuria, Bahir Dar urban, and Mecha.

From the ten channels identified, the channel through which the largest share of butter passed was Producers→Village collectors→Retailers→Consumers and this accounted about 28.22% of the quantity of butter transacted by the butter marketing actors in the study area. The second and third butter marketing channels in terms of volume were Producers-Consumers and Producer-Retailer-Consumer and these channels accounted about 21.63% and 12.64% of the total volume of products respectively.

- I. Producers →Village collectors→Retailers →Consumers (22721kg = 28.22%)
- II. Producers→Village collectors→Wholesalers→Retailers→Consumers
(2520kg = 3.13%)
- III. Producers →Retailers →Consumers (10176kg = 12.64%)
- IV. Producers→Retailers→Cafeteria/Restaurants/Hotels→Consumers (2400kg = 2.98%)
- V. Processors→Consumers (9125kg = 11.33%)
- VI. Processors→Cafeteria/Restaurants/Hotels→Consumers (4635kg = 5.76%)
- VII. Processors→Retailers→Consumers (3695kg = 4.59%)
- VIII. Cooperatives→Retailers→Consumers (1076.2 = 1.34%)
- IX. Cooperative→Consumers (6750kg = 8.38%)
- X. Producers→Consumers (17420kg = 21.63%)

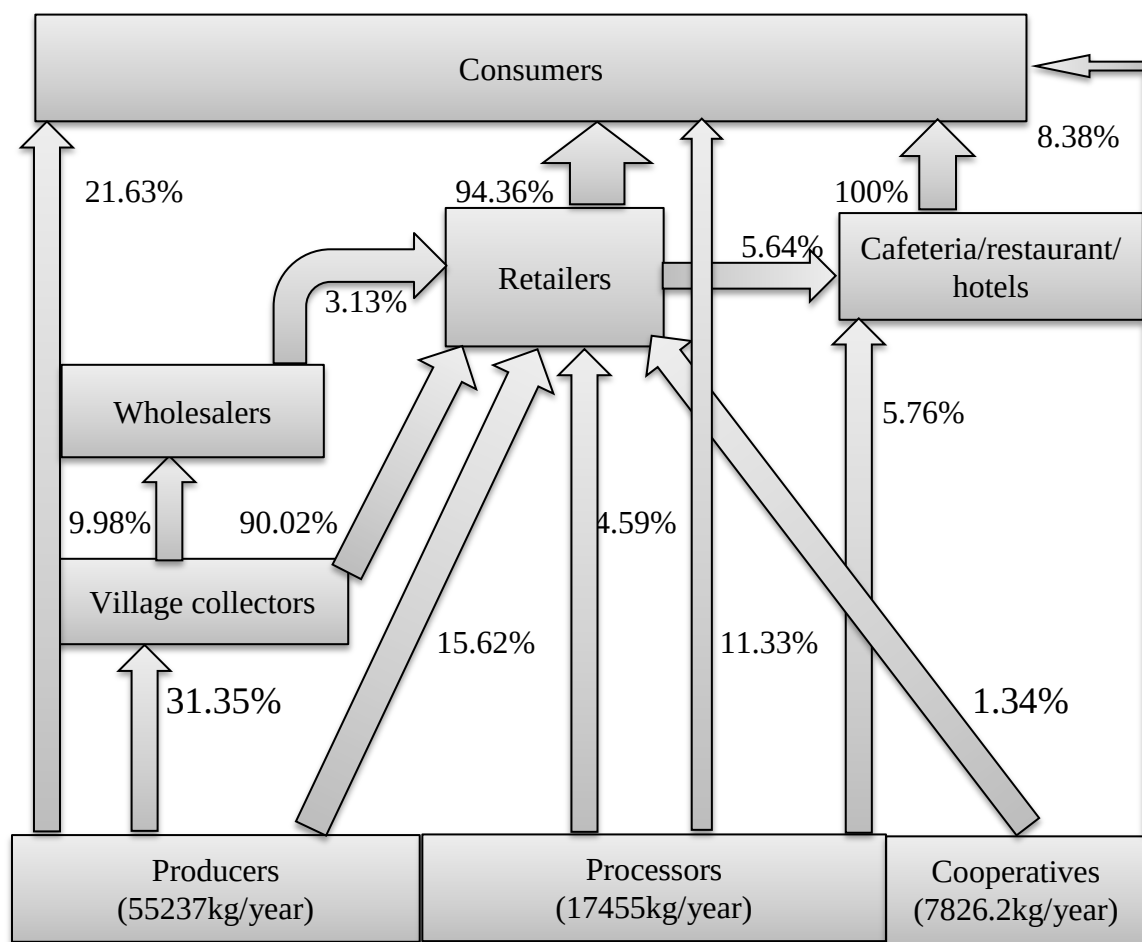


Figure 5. Butter marketing channel

Source: Own sketch from survey result, 2016.

4.6 Relationships and Trust among Dairy Marketing Actors

Trust is the highest informal institution practiced by the trading partners in the study area. In the dairy marketing, informal type of agreement which is based on mutual understanding or trust plays an important role in trading between the trading partners. According to the group discussion with traders and with dairy producer farmers, formal contractual agreement was not commonly practiced except between the members and milk cooperative. The trade relationship was mostly informal based on mutual understanding, that is, trust.

Likert scale was used to measure the relationship and degree of trust the dairy producers have with different actors in the dairy marketing. Out of the total dairy producers who were non-members of a cooperative and participate in milk market, 39 (69.64%) of them use informal type of contractual agreement while the rest only 4 (7.14%) of them use formal

(written) type of contractual agreement. This indicates that the dairy producers' and the buyers' trading relation was governed by mutual understanding. This informal contract is basically verbal or in a form that may not be considered acceptable in a formal court for dispute settlement.

Based on the survey result conducted, there was strong relationship between the dairy producers regarding dairy marketing. Of the total households surveyed, 82 (51.3%) of them reported that there was strong relationship among them while 22 (13.8%) of them reported very strong relationship among them. The rest 43 (26.9%), 3 (1.9), and 10 (6.3%) reported weak, very weak, and no relationship at all respectively among the dairy producers. The group discussion participants were also confirmed the existence of good relationship among the dairy producers.

The relationship between dairy producers and village traders was very loose. The study had indicated that 122 (76.3%), 14 (8.8%), and 23 (14.4%) of the dairy producers reported no relation at all, weak, and very weak relationship between the producers and village traders. The group discussion also confirmed the weak relationship between the dairy producers and dairy traders. The focus group discussion participants claimed that the traders even cheated on price and weighting scale during buying their products. As it is observed from the table below, the relationship (the linkage) with different actors in the dairy marketing was generally very weak (Table 31).

Table 31. Evaluation of relationship status of producers with dairy marketing actors regarding dairy marketing

Dairy marketing actors	Relationship status with dairy producers										Total
	No relation at all		Very weak		Weak		Strong		Very strong		
	N	%	N	%	N	%	N	%	N	%	
Other Dairy producers	10	6.3	3	1.9	43	26.9	82	51.3	22	13.8	160
Village collectors	122	76.3	14	8.8	23	14.4	0	0	1	0.6	160
Traders	46	28.8	25	15.6	53	33.1	28	17.5	8	5	160
Commission men/brokers	149	93.1	8	5	2	1.3	1	0.6	0	0	160
Cooperatives	90	56.3	4	2.5	5	3.1	29	18.1	32	20	160
Processors	155	96.6	1	0.6	1	0.6	3	1.9	0	0	160
Consumers	72	45	26	16.3	20	12.5	28	17.5	14	8.8	160
Restaurants/hotels/café	110	68.8	12	7.5	14	8.8	20	12.5	4	2.5	160
Input suppliers	24	15	6	3.8	40	25	73	45.6	17	10.6	160
Government	7	4.4	10	6.3	32	20	91	56.9	20	12.5	160
Total	785		109		233		355		118		

Source: Own computation from survey result, 2016.

Regarding the relationship with dairy producers and the direct consumers, most 72 (45%) of dairy producers reported absence of relationship at all, 26 (16.3%), and 20 (12.5%), of them reported very weak and weak relationship respectively. The remaining 28 (17.5%), and 14 (8.8%) of the dairy producer samples had confirmed strong and very strong relationship respectively with direct consumers of milk.

Trust the dairy producers have on different buyers and the government was also measured by Likert scale using proxy variables (question items). Many issues were raised concerning trust the member producers have on the cooperative (Table 32). The survey results indicated that most of the sample dairy producers who were member of cooperatives had good trust on the cooperative. However, there were also indicators on dissatisfaction of members on the cooperative on issues such as paying of good prices for their milk; provision of services as it was expected; standing for the right of its members; equal treatment of the cooperative to its members and so on.

Table 32. Trust status of member dairy producers on their cooperative

Description	Scale								Total
	Strongly disagree		Disagree		Agree		Strongly agree		
	N	%	N	%	N	%	N	%	
The cooperative is established to benefit the dairy producers	0	0.0	12	17.9	35	52.2	20	29.9	67
There is good relationship between producers and the cooperative	0	0.0	5	7.5	43	64.2	19	28.4	67
The cooperative treats producers with care	0	0.0	16	23.9	40	59.7	11	16.4	67
The cooperative treats all producers equally	1	1.5	10	14.9	38	56.7	18	26.9	67
The cooperative pays good price to dairy producers	6	9.0	37	55.2	21	31.3	3	4.5	67
The cooperative decisions are to benefit both the cooperative and the dairy producers	2	3.0	8	11.9	46	68.7	11	16.4	67
The cooperative provides services to producers as expected	8	11.9	31	46.3	22	32.8	6	9.0	67
The cooperative stands for the right of its producer members	0	0.0	24	35.8	33	49.3	10	14.9	67
The cooperative creates market linkages	3	4.5	19	28.4	29	43.3	16	23.9	67

Source: Own computation from survey result, 2016.

A reliability analysis was carried out on the sample dairy producers who are members of the milk cooperative comprising 9 items (proxy variables) to test the reliability of the items included in the questionnaire. Cronbach alpha (α) was used to measure the internal consistency reliability of these items used in the study. As it is indicated in the result of the reliability analysis statistics (Table 33), the coefficient of the Cronbach's alpha is 0.843 which shows that the questionnaire is reliable.

Table 33. Reliability Statistics for milk cooperative members

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
.843	.847	9

Source: Own computation from survey result, 2016.

Item-total statistics analysis was also done to decide whether any item need to be removed or deleted from the list of items to gives the Cronbach's alpha score that would higher than the obtained coefficient of .843. As it is observed from the last column of the table

Cronbach's Alpha if item Deleted (Table 34), there is no higher score of α coefficient than .843 and this indicates that all the items used in the questionnaire are reliable. In addition to this, the "Corrected Item - Total Correlation" column that indicates how much each item correlates with the overall questionnaire score has a correlation r of above .30 indicating that the item belongs on the scale.

Table 34. Item-Total Statistics for milk cooperative members

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
The cooperative is established to benefit the dairy producers	22.57	14.643	.459	.360	.836
There is good relationship between producers and the cooperative	22.48	14.405	.652	.580	.819
The cooperative treats producers with care	22.76	14.700	.497	.391	.832
The cooperative treats all producers equally	22.60	14.608	.462	.403	.836
The cooperative pays good price to dairy producers	23.37	13.571	.670	.515	.814
The cooperative decisions are to benefit both the cooperative and the dairy producers	22.70	14.485	.540	.447	.828
The cooperative provides services to producers as expected	23.30	13.303	.597	.494	.822
The cooperative stands for the right of its producer members	22.90	13.610	.680	.531	.813
The cooperative creates market linkages	22.82	13.725	.503	.396	.834

Source: Own computation from survey result, 2016.

Milk processors were not found in the rural kebeles of the surveyed districts but were located in urban kebeles (Bahir Dar City). Due to this reason, there was no relationship between dairy producers found in the kebeles found in Bahir Dar Zuria and Mecha districts. Most of the sample producers from Bahir Dar city also reported that they did not have trust on the processors. This showed weak relationship between the dairy producers and the private dairy processors and according to the producers, this was mainly due to the poor linkage between the two trading parties. This absence of relationship with processors was also confirmed by group discussion participants.

Traders and dairy producers were among the major actors in the dairy marketing. But in areas where there were dairy cooperatives, they may have limited relationship due to the reason that the transaction might be between the dairy producers and the cooperatives or between the dairy cooperatives and traders. Especially this relation was observed in milk marketing. Due to its nature of perishability, milk needs fast transaction and chilling materials in order to keep its quality. Due to this and other reasons, the milk cooperatives/milk processors were preferred by the dairy producers than the traders in the surveyed area. But, concerning butter, the dairy producers have more relationship with traders than cooperatives/processors. So the trust the dairy producers had on traders indicates more relational ties with butter traders (Table 35).

Table 35. Trust the dairy producers have on traders

Description	Scale								Total
	Strongly disagree		Disagree		Agree		Strongly agree		
	N	%	N	%	N	%	N	%	
There is good relationship between producers (suppliers) and the traders	9	6.6	40	29.4	76	55.9	11	8.1	136
The traders treat producers with care	16	11.8	57	41.9	56	41.2	7	5.1	136
The traders treats all producers equally	21	15.4	64	47.1	45	33.1	6	4.4	136
The traders pay good price to dairy producers	24	17.6	59	43.4	51	37.5	2	1.5	136
The traders’ decisions benefit both the traders’ and the dairy producers	15	11.0	64	47.1	56	41.2	1	0.7	136
The traders provide services to producers as expected	16	11.8	76	55.9	40	29.4	4	2.9	136
The trader stands for the right of its suppliers	40	29.4	58	42.6	37	27.2	1	0.7	136

Source: Own computation from survey result, 2016.

A reliability analysis comprising 7 items (proxy variables) for trust the dairy producers have on traders was also carried out to test whether the items included in the questionnaire are reliable or not. The coefficient of the Cronbach's alpha is 0.865 showing that the questionnaire is reliable (Table 36).

Table 36. Reliability Statistics for dairy producers on traders

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
.865	.863	7

Source: Own computation from survey result, 2016.

Item-total statistics analysis was also done to decide whether any item need to be removed or deleted from the list of proxy variables to give the Cronbach's alpha score that would be higher than the obtained coefficient of .865. As it is observed from the last column of the table Cronbach's Alpha if item Deleted (Table 37), there is no higher score of α coefficient than .865 and this indicates that all the items used in the questionnaire are reliable. In addition to this, the "Corrected Item - Total Correlation" column that indicates how much each item correlates with the overall questionnaire score has a correlation r of above .30 indicating that the item belongs on the scale.

Table 37. Item-Total Statistics for dairy producers on traders

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
There is good relationship between producers (suppliers) and the traders	13.44	11.582	.549	.353	.858
The traders treat producers with care	13.69	10.497	.730	.574	.832
The traders treats all producers equally	13.83	10.660	.706	.576	.836
The traders pay good price to dairy producers	13.87	10.960	.663	.454	.842
The traders' decisions benefit both the traders' and the dairy producers	13.78	12.099	.481	.281	.865
The traders provide services to producers as expected	13.86	11.425	.623	.492	.848
The trader stands for the right of its suppliers	14.10	10.671	.700	.594	.837

Source: Own computation from survey result, 2016.

Sample producers were also expressed their agreement on issues regarding government activities or government decisions on dairy marketing. Even though most of them agreed on many issues such as decisions on benefiting the producers and equally treatments by the government, they showed less agreement with issues such as on the expected of provision of services, on the laws or legal systems regarding dairy marketing, and on creating market

linkages with buyers (Table 38). They reported that the government showed poor activities to help the dairy producers to facilitate their dairying and creating sustainable markets in the area.

Table 38. Trust the households have on government

Description	Scale								Total
	Strongly disagree		Disagree		Agree		Strongly agree		
	N	%	N	%	N	%	N	%	
There is good relationship between producers and the government	18	11.3	32	20.0	93	58.1	17	10.6	160
The government treats all producers equally	13	8.1	44	27.5	90	56.3	13	8.1	160
The government decisions are to benefit the dairy producers	7	4.4	29	18.1	95	59.4	29	18.1	160
The government provides services to producers as expected	13	8.1	78	48.8	61	38.1	8	5.0	160
The government creates market linkages	60	37.5	68	42.5	26	16.3	6	3.8	160
The government laws are to benefit the dairy producers	35	21.9	87	54.4	35	21.9	3	1.9	160
The legal system are trusted by the producers	17	10.6	94	58.8	47	29.4	2	1.3	160

Source: Own computation from survey result, 2016.

4.7 Transaction Costs in Dairy Marketing

4.7.1 Transaction Costs for Dairy Producers

The transaction costs for the sample dairy producers associated with milk and butter marketing were summarized in Table 39 and Table 40 respectively. As the result indicates, the highest mean of transaction cost incurred in milk marketing by the dairy producers was the cost for searching trading partner (buyer) for milk which was estimated about 0.08 Birr per liter of milk (Table 39). The next transaction cost was recorded as costs for searching price information for milk for which they incurred an average of 0.04 Birr/liter whereas the mean transaction cost for screening of potential buyers for milk was estimated as 0.03 Birr/liter. This showed that the dairy producers were facing difficulties in searching buyers for their milk. The least cost observed in this transaction cost was 0.01 Birr/liter incurred for enforcement of law (settling case) for breaching contract in milk transaction. As the

result indicates, the costs associated with searching trading partner, price information, and screening potential partners are higher as compared to the other costs and this shows the lack of market linkage between the sellers and the buyers.

In addition to the transaction costs, transportation cost was another cost incurred during transporting of milk to the destination where it is sold. The dairy producers who sold milk paid out an average of 0.13 Birr per liter for transporting the milk. The high cost for transporting milk as compared to other transaction costs was due to the fact that since raw milk is highly perishable, it requires rapid transportation to consumption centers or to processing plants.

Table 39. Transaction and transportation costs in milk marketing by dairy producers (Birr/liter)

Cost category	N	Min.	Max.	Mean	Std. Dev.
Cost for searching trading partner (buyer) for milk	121	0	3.15	0.08	0.33
Cost for searching of price information for milk	121	0	0.87	0.04	0.15
Cost for Screening of potential partner for milk	121	0	0.69	0.03	0.08
Cost for negotiation (bargaining) to reach agreement for milk	121	0	0.81	0.02	0.08
Cost for enforcement of law(settling case) for breaching contract for milk	121	0	0.28	0.01	0.04
Cost for transporting milk	121	0	2.22	0.13	0.32

Source: Own survey result, 2016

The other transaction cost incurred by the dairy producers in dairy marketing was costs for butter marketing. Out of the total transaction costs for butter marketing, the highest cost was the cost incurred for searching trading partner (buyer) of butter. On average, the dairy producers incurred about 3.34 Birr per kilogram of butter for searching trading (buyer) partner. The other costs for searching of price information, screening of potential partner, negotiation (bargaining) to reach agreement, and cost for enforcement of law (settling case) for breaching contract were 1.40, 1.39, 1.40, and 1.20 Birr/kg of butter respectively (Table 40). Another cost the dairy producers incurred was the transportation cost to move the butter to market. On average, they incurred 0.75 Birr per kg for transporting butter.

Table 40. Transaction and transportation costs in butter marketing by dairy producers (Birr/kg)

Cost category	N	Min.	Max.	Mean	Std. Dev.
Cost for searching trading partner (buyer) for butter	33	0	55.00	3.34	9.82
Cost for searching of price information for butter	33	0	14.85	1.40	3.29
Cost for screening of potential partner for butter	33	0	8.99	1.39	2.56
Cost for negotiation (bargaining) to reach agreement for butter	33	0	14.85	1.40	3.40
Cost for enforcement of law(settling case) for breaching contract for butter	33	0	15.25	1.20	3.41
Cost for transporting butter	33	0	8.82	0.75	1.83

Source: Own survey result, 2016.

4.7.2 Transaction Costs for Traders

The transaction costs associated with traders in milk marketing are summarized in Table 41. The highest transaction cost was the costs for searching trader partners for milk sellers. The traders who trade milk incurred an average of 0.05 Birr per liter for searching milk sellers. The next transaction cost was costs incurred for searching buyer trading partners in which each milk traders spend an average of 0.03 Birr/liter. The other transaction cost parts had less costs and some traders have no any expenses on them like cost for enforcement of law (settling case) for breaching contract. This indicates that the major expenditure for transaction costs in milk marketing was costs for searching trading partners. The transport cost incurred for transporting milk was high as compared to the transaction costs. On average, the traders spent 0.51 Birr/liter for transporting milk.

Table 41. Transaction and transport costs in milk marketing by traders (Birr/liter)

	N	Min.	Max.	Mean	Std. Dev.
Cost for searching trading partner (seller) for milk	10	0	0.25	0.05	0.09
Cost for searching trading partner (buyer) for milk	10	0	0.18	0.03	0.06
Cost for searching of price information for milk	10	0	0.04	0.01	0.02
Cost for Screening of potential partner for milk	10	0	0.03	0.00	0.01
Cost for negotiation (bargaining) to reach agreement for milk	10	0	0.01	0.00	0.00
Cost for enforcement of law(settling case) for breaching contract for milk	10	0	0.00	0.00	0.00
Cost for Transport (during transporting the product) for milk	10	0	1.20	0.51	0.43

Source: Own survey result, 2016.

Table 42 summarizes transaction cost incurred by traders for butter marketing. Out of all the transaction costs, the costs spent for screening potential partners for butter traders took the highest share. The traders spent a mean of 3.62 Birr per kilogram for this transaction. The next high costs were incurred for searching butter seller partners and for negotiation (bargaining) to reach an agreement with mean of 0.20 and 0.16 Birr/kg respectively. Another cost incurred by butter trader was for transporting the product to market and on average they spent 2.04 Birr/kg for butter.

Table 42. Transaction and transport cost in butter marketing by traders (Birr/kg)

Cost category	N	Min.	Max.	Mean	Std. Dev.
Cost for searching trading partner (seller) for butter	22	0	1.91	0.20	0.46
Cost for searching of price information for butter	22	0	0.90	0.08	0.20
Cost for screening of potential trading partner for butter	22	0	78.00	3.62	16.62
Cost for negotiation (bargaining) to reach agreement for butter	22	0	1.79	0.16	0.39
Cost for enforcement of law(settling case) for breaching contract for butter	22	0	0.93	0.09	0.22
Cost for Transport cost (during transporting the product) for butter	22	0	33.25	2.04	7.12

Source: Own survey result, 2016.

4.8 Econometric Model Estimation Results

4.8.1 Determinants of Milk Market Participation

Before the analysis was conducted, multicollinearity, heteroscedasticity and endogeneity detection tests were performed using appropriate test statistics. Variance Inflation Factor (VIF) was used to test the collinearity among the continuous explanatory variables and some of the variables that showed high multicollinearity problem were excluded from the analysis. The explanatory variables that were free of multicollinearity were then used for the analysis. These variables have a mean of 1.42 VIF which is less than 10 (Table 43).

Table 43. Variance inflation factor for continuous variables used in milk market participation

Variable	VIF	1/VIF
Experience in dairy farming	1.70	0.589
Total land holding	1.67	0.597
Price of milk in kebele	1.67	0.597
Age of the household head	1.43	0.701
Household size	1.24	0.809
Livestock size excluding than dairy cows	1.23	0.810
Distance to nearest milk market	1.02	0.978
Mean VIF	1.42	

Source: Own survey result, 2016.

The dummy explanatory variables were tested for multicollinearity using the Contingency Coefficient (CC) and the result has indicated that they have mean of 0.175 which is less than 0.75 (Table 44). The robust standard error was used to correct the heteroscedasticity. To test the endogeneity problem, the technique of instrumental variables was used and it was found that the model was free of endogeneity.

Table 44. Contingency Coefficients for dummy independent variables used in milk market participation

Variables	CC
Sex of the respondent	.141
Education level of the dairy producer	.246
Access to marketing information	.339
Access to credit	.073
Contact with livestock extension agent	.034
Non/off farm income	.004
Membership to milk cooperative	.389
Mean CC	0.175

Source: Own survey result, 2016.

In the analysis of Milk Market Participation, fourteen explanatory variables were used to estimate the milk market participation decision of the dairy producer households using the Probit Model in the Heckman Two-Stage econometric estimation procedure (Table 45).

The probit model has been estimated by the maximum likelihood method. The likelihood Ratio (LR) indicated by χ^2 statistics was highly significant ($p < 0.0000$) for the test of the null hypothesis that all of the coefficients associated with independent variables are simultaneously equal to zero. The high significance indicates that the model has strong explanatory power. The Pseudo R^2 was 0.4435 confirming the model specification fits the

data well. The variables included in the model explain 44% of the variation in the degree of milk market participation of the dairy producers.

Among the explanatory variables used in the econometric estimation, seven variables were continuous variables while seven variables were categorical/dummy variables. Out of the explanatory variables used, five of them significantly affected the participation of dairy producers in milk marketing. Sex of the respondent negatively and significantly affected the milk market participation decision. Price of milk in kebele, total land holding size, access of the respondent to marketing information, and membership to dairy cooperatives significantly and positively affected the milk market participation of the dairy producers.

Sex of the Respondent (SER): Being male affected the milk market participation negatively and significantly at 1% significance level. This is in contrary to the prior expectation. This might be due to that male headed households may not need to sell milk instead they use other alternatives such as crop production as a main income generating activities while female dairy producers use milk as a means of income for different home consumption. Most women tend to keep dairy animals and other livestock such as poultry and shoat and their contribution in management of livestock such as feeding, cleaning of shelters, milking and others is high. The marginal effect indicates that, being male decreases the probability of milk market participation by 10.6%.

Price of Milk in Kebele (PMILKK): As the prior expectation, it affected positively and significantly the milk participation at 1% significance level. As the price of milk increases, the producers are encouraged to sell milk because of the high price incentive. The results of the marginal effect confirms that as the average milk price in kebele increases by one Birr, the probability of dairy producer to participate in milk marketing increases by 14.8%.

Total Land Holding Size (TLAND): This variable affected the probability of market participation positively and significantly at 1% significance level. As the dairy producer owns more land, he allocates land to forage production to increase his milk production and this increase in milk production leads to sell milk. The marginal effect result indicated that as the land holding size increased by one hectare, the probability to participate in milk selling increased by 10.5%. But this is in contrary with the findings of Berhanu *et.al.* (2014) in their study on factors affecting milk market participation in which they found that total land affected negatively the milk market participation of dairy producers. It is

also contrary with the findings of Kiwanuka and Machethe (2016) in their study on the determinants of smallholder farmers' participation in Zambian dairy sector's interlocked contractual arrangements.

Household Access to Marketing Information (ACCINF): As expected, this dummy variable affected the milk market participation positively and significantly at 1% significance level. The marginal effect results show that, keeping other factors constant, having access to market information increases the probability of market participation by 15.7%. This result is in line with the findings of Meryem (2013) in the study of analysis of cow milk market Chain. Jari and Fraser (2014) have also found that households are most likely to increase participation in both formal and informal markets with the availability of market information. Kiwanuka and Machethe (2016) have also found the same result in their study on the determinants of smallholder farmers' participation in Zambian dairy sector's interlocked contractual arrangements.

Membership to Milk Cooperative (MRCOOP): As its prior expectation, being a member to milk cooperative has increased the probability of market participation positively and significantly at 1% significance level. As the dairy producer become a member to milk cooperative, keeping other factors constant, the probability of milk market participation increases by 25.8%.

Table 45. Factors affecting milk market participation

variables	Coef.	Robust Std. Err	P> z	Marginal Effect
Constant	-7.940	2.435	0.001	
Sex of the Respondent	-1.251***	0.459	0.006	-0.106
Age of the household head	-0.023	0.016	0.151	-0.003
Education level of the household head	0.226	0.158	0.153	0.035
Household size	-0.003	0.127	0.981	0.000
Experience in dairy farming	0.000	0.018	0.995	0.000
Non/off farm income	-0.144	0.315	0.646	-0.023
Livestock size excluding dairy cows	0.148	0.087	0.089	0.023
Price of milk in kebele	0.964***	0.260	0.000	0.148
Total land holding size	0.684***	0.213	0.001	0.105
Access to marketing information	0.895***	0.325	0.006	0.157
Membership to milk cooperative	1.808***	0.476	0.000	0.258
Access to credit	-0.525	0.547	0.337	-0.059
Distance to nearest milk market	0.030	0.054	0.578	0.005
Contact with livestock extension agent	-0.379	0.333	0.256	-0.050

Number of obs =160; LR $\chi^2(14) = 45.35$; $\text{Prob} > \chi^2 = 0.0000$; Log pseudo likelihood = -49.451516; Pseudo $R^2 = 0.4435$; *** = Statistically significant at 1% significance level

Source: Own computation from survey result, 2016.

4.8.2 Determinants of Volume of Milk Marketed

The determinant variables for volume of milk marketed are indicated in the Second-Stage Heckman Selection Estimation procedure. The reported model χ^2 test (Wald test) is 42.90 and is significant at 1% significance level. Results of the Second-Stage Heckman Selection Estimation indicated that among the thirteen explanatory variables used in the model, seven variables affected significantly the volume of milk marketed (Table 46).

Sex of the dairy producer (SER): As it was expected, this dummy variable affects the volume of milk marketed negatively and significantly at 5% significance level. As the econometric result shows, being male decreases the volume of milk marketed by 3.63 liters. This may be due to that male headed households prefer to consume milk but are likely to sell other commodities like grains while female headed households may need to sell more milk to cover their financial needs.

Education Level of the Household Head (EDUC): As it was expected, this variable affects the volume of milk marketed positively and significantly at 5% significance level. As the household head gets moves to higher education level, the volume of milk marketed increases by 1.07 liters. This might be due to the reason that increasing education status

creates awareness of the benefits of selling livestock products and increases the way to commercialization of smallholder farmers. This finding is in line with the findings of Kiwanuka and Machethe (2016) in their study on the determinants of smallholder farmers' participation in Zambian dairy sector's interlocked contractual arrangements.

Household Size (HSIZE): It represents the number of people living in the same house within the household and share living and is measured in adult equivalent. As the prior expectation, it affects the volume of milk marketed negatively and significantly at 5% significance level. As the household size increases by one adult equivalent, the volume of milk sold to the market decreases by 1.03 liters. This may be due to the fact that increased number of household members need additional food especially during the childhood age is highly associated with high milk consumption. This depicts that the larger household size, the more volume of milk required for domestic consumption especially for children and reduces the amount of milk to be marketed. This finding is in line with the findings of Berhanu *et al.* (2014) and Berhanu and Moti (2010).

Experience in Dairy Farming (EXPDAIRY): As it was expected, this variable affects the volume of milk marketed positively and significantly at 5% significance level. As the dairy producer gets more experience in dairy farming, he creates awareness on the allocation of the product and look for other alternatives such as selling of milk, hence this in turn increases the volume of milk produced to sell to the market. The model result revealed that as the experience in dairy farming increases by one year, the volume of milk marketed increases by 0.2 liter. This finding is consistent with findings of Berhanu *et al.* (2014).

Livestock size excluding Dairy Cow (LSEXD): As the prior expectation, this variable affects the volume of milk marketed positively and significantly at 10% significance level. As the number of livestock excluding dairy cows increase by 1 TLU, the volume of milk to be marketed increases by 0.42 liters. This may because that as the number of other livestock increases, the income generated from these livestock increases and this increase income may be used to purchase additional dairy cows and this in turn enhances to sell additional volume of milk to the market.

Total land holding Size (TLAND): It affects the volume of milk marketed negatively and significantly at 5% significance level. As the total land holding size of the household increases by one hectare, the volume of milk marketed decreases by 1.4 liters. This may be

because households with more land holding tend to produce more crops and enjoy high income from these agricultural products and decrease their focus on dairy farming. This in turn decreases the selling of milk to markets.

Access to Credit (ACREDIT): As its prior expectation, the household access to credit decreased the volume of milk marketed negatively and significantly at 5% significance level. As the dairy producer gets access to credit, the volume of milk marketed decreases by 4.2 liters. This may be because as the dairy producer got access to credit, he may use this credit to cover some financial gaps which could be found from milk sale and then he may reduce the volume of milk to be sold.

Inverse Mill's Ratio (lambda): As it is observed from the Heckman two-stage estimation, the Inverse Mill's Ratio (lambda) is significant at 5% significance level. This indicates the existence of sample selection bias, that is, the existence of some unobservable variables affecting the likelihood to participate in milk market and thereby affecting volume of milk supply to market. The estimation result rejects the null hypothesis of $H_0: \rho = 0$. The Rho (ρ) = -0.82161 is significant and this indicates the correlation among the two equations (the outcome equation and the selection equation). The unobserved variables affect the milk market participation and then affect the volume of milk marketed.

Table 46. Second-stage Heckman selection estimation for factors affecting volume of milk marketed

Variables	Coef.	Std. Err	P> z
Constant	17.230	7.100	0.015
Sex of the respondent	-3.629**	1.677	0.030
Age of the household head	0.094	0.063	0.135
Education level of the household head	1.072**	0.494	0.030
Household size	-1.034**	0.472	0.029
Experience in dairy farming	0.165**	0.077	0.032
Non/off farm income	-1.712	1.219	0.160
Livestock size excluding dairy cows	0.417*	0.222	0.061
Price of milk in kebele	-0.394	0.609	0.517
Total land holding	-1.401**	0.705	0.047
Household access to marketing information	1.740	1.529	0.255
Access to credit	-4.225**	2.021	0.037
Distance to nearest milk market	-0.222	0.198	0.263
Contact with livestock extension agent	-0.245	1.441	0.865
Inverse Mills Ratio (Lambda)	-5.044**	2.049	0.014

Rho = -0.82161; Sigma = 6.1392862; Number of obs =121; Wald chi² (13) = 42.90; Prob > chi² = 0.0000; ** and *: Statistically significant at 5% and 10% significance level respectively.

Source: Own computation from survey result, 2016.

4.8.3 Econometric Estimation Results of Contract or Non-Contract using behavior of Dairy Producers

The Contract or Non-Contract using behavior of the dairy producer in selling his/her milk was estimated using the maximum likelihood estimate of probit model. The LR chi² with appropriate degrees of freedom is 34.01 with a p-value of 0.0004 which is significant at 1% significance level. The pseudo R², also known as the McFadden's R² (Scotting and Freese, 2001), is a measure of fit and is 0.2347. The Pseudo Likelihood is -37.581482 (Table 47).

Experience in dairy farming (EXPDAIRY): This variable affected the using contractual agreement significantly and positively at 10% significance level. As the number of years in dairy farming experience increases by one year, the probability of the dairy producer to use contractual agreement increases by 0.5%. This might be because the dairy producers who have long experience in dairy farming know the advantage of using contractual agreements.

Non/off Farm Income (NFINC): Farmers may participate in non/off farm income because agriculture may not absorb all the new entrants in to the labor market and hence they go

beyond and try to earn additional income to the family. The marginal effect of the model result revealed that non/off farm income affected the contract using behavior of dairy producer negatively and significantly at 1% significance level. Participation in non/off farm income generating activities decreased the probability of using contractual agreement by 18.1%. This may be because as the dairy producer obtains other non/off farm income, they become more risk takers and they may not want to depend on contractual bases but want to sell to other alternatives for better prices. It is consistent with the findings of Kiwanuka and Machethe (2016) who found that gross income from other sources decrease the probability of dairy producers to participate in contract agreement for milk selling. The result is also consistent with Velandia *et al.* (2009) who found that non/off farm income was negatively related to using contractual based transactions. On the contrary, this finding was inconsistent with the finding of Antoni and Mishra (2012) who found that other income obtained from non/off farm activities had increased the probability to use contract agreement programs.

Membership to Milk Cooperative (MRCOOP): As the prior expectation, being membership to dairy cooperative affected using contractual agreement significantly and positively at 10% significant level. The marginal effect depicts that being membership to milk cooperative increase the probability of using contractual agreement by 11.6%. This might be due to the fact that as the cooperative is a formal institute or farmers' organization, the dairy producer may prefers to join that body than other alternatives and agree to sell with contractual bases so as to create stable market. Mailu *et al.*, (2014) have also found that collective action institutions such as milk cooperatives encourage farmers to engage in formal contractual agreements. It is also consistent with the findings of Odunze *et al.* (2015) who found that membership of farmer's association affect positively the participation in contractual agreement in maize and soya bean.

Access to Credit (ACREDIT): This dummy variable affected negatively and significantly the probability of using contract for selling milk at 10% significance level. As the access to credit institution increases, the dairy producer may develop confidence in case of loses and prefer non-contract to sell his milk provided that it may have better price. The marginal effect in the model revealed that as the household get access to credit institution, the probability of using contractual agreement to sell milk decreases by 8.8%.

Table 47. Factors affecting contract use of dairy producers for milk sale.

Variables	Coef.	Robust Std. Err.	P> z	Marginal Effect
_cons	1.723	1.111	0.121	
Sex of the respondent	-0.580	0.471	0.219	-0.066
Age of the household head	0.004	0.016	0.793	0.001
Education level of the household head	0.004	0.163	0.983	0.001
Household size	0.181	0.116	0.119	0.027
Experience in dairy farming	0.031*	0.018	0.084	0.005
Non/off farm income	-0.990***	0.326	0.002	-0.181
Livestock size excluding dairy cows	-0.074	0.046	0.102	-0.011
Membership to milk cooperative	0.735*	0.444	0.098	0.116
Access to credit	-1.066*	0.557	0.055	-0.088
Distance to nearest milk market	0.074	0.055	0.175	0.011
Contact with livestock extension agent	-0.612	0.512	0.232	-0.073

Number of obs = 121; LRchi²(11) = 34.01; Prob >chi² = 0.0004; Pseudo R² = 0.2347;
Pseudo likelihood = -37.581482. *** and *: Statistically significant at 1% and 10%
significance level respectively.

Source: Own computation from survey result, 2016.

4.8.4 Determinants of Formal Agreement, Informal Agreement, and Non-Contract in Milk Marketing

Multinomial Logit Model was employed to estimate factors affecting the Formal Agreement, Informal Agreement, and Non Contract in milk marketing (Table 48). The Pseudo R² for the model is 0.5211 indicating the specification fits the data well and the variables included in the model explain 52% of the variation in choosing different contractual agreements. Nine explanatory variables were used for the analysis of the MNL model. Among these variables, four of them were continuous variables while the rest were dummy variables. Four variables affected the formal agreement significantly and four variables affected the informal agreement significantly putting the Non-contract as a base category. Non- Contract has been chosen as a base outcome or base category because the author of this thesis wants to compare the formal and informal contracts in reference to this non-contract. As stated in Kleinbaum and Klein (2010), the choice of reference can be arbitrary and it can be chosen by the decision of the researcher.

Experience in Dairy Farming (EXPDAIRY): The number of years the respondent engaged in dairy farming has a positive effect at 10% significance level on the probability of the dairy producer in using formal contract agreement. As the number of years in dairy farming experience increases by one year, the likelihood to use formal contractual

agreement increases by 0.5%. This might be because the dairy producers who have long experience in dairy farming know the advantage of using formal contractual agreements.

Non/off Farm Income (NFINC): This variable is negatively and significantly associated with using the formal agreement at 5% significance level and also it is associated negatively and significantly with using informal agreement at 1% significance level. This might be due to the fact that farmers having other sources of income are willing to accept more risk in order to get a higher expected income and tend to reject contractual agreement. Having non/off farm income decreases the probability of using formal contract agreement by 3.6% and decreases the probability of using the informal agreement by 16.3% as compared to non-contract. The result is consistent with Velandia *et al.* (2009) who found that non/off farm income was negatively related to using contractual based transactions.

Membership to Milk Cooperative (MRCOOP): Being membership of milk cooperative affected the probability of using formal contractual agreement positively and significantly at 1% significance level and it affected the likelihood to use informal negatively and significantly at 10% significance level. Being member of milk cooperative decreases the likelihood to choose informal contractual agreement in milk marketing by 32.7% as compared to the base category. Being member of milk cooperative also increases the likelihood to choose formal contractual agreement in milk marketing by 35.3% as compared to the base category. This is in line with the finding of Mailu *et al.*, (2014) who found that collective action institutions like milk cooperatives encourage participation in formal contractual based agreements.

Access to Credit (ACREDIT): Access of dairy producers to credit affected the probability of using formal contractual agreement negatively and significantly at 10% significance level. This might be that the access of credit may help him/her in satisfying his/her financial gaps and may develop confidence and may not want to dependent on formal contractual based agreements. The marginal effect depicts that having access to credit institution decreases the probability of using formal contractual agreement by 13.3% as compared to the base category.

Availability of Contact with Livestock Extension Agent (CONLEX): The availability of contact with livestock extension agent affected the probability of using informal

contractual agreement negatively and significantly at 10% significance level. The reason might be that the livestock extension agent may advise the dairy producer to sell his/her milk in a way that it brings better prices than depend on informal contractual agreement. The marginal effect depicts that as the dairy producer creates contact with livestock extension agent, the likelihood to use informal contractual agreement decreases by 14.7% as compared to the base category.

Livestock size excluding dairy cows (LSEXD): The livestock size other than dairy cows affected the likelihood of dairy producers to use informal contractual agreement negatively and significantly at 10% significance level. The marginal effect result reveals that as the livestock size other than dairy cow increases by one TLU, the likelihood of the dairy producer to use informal contractual agreement decreases by 3.1% as compared to the base outcome.

Table 48. Factors affecting formal, informal, or non-contract agreements in milk marketing

Variables	Formal agreement			Informal agreement		
	Coef.	Std. Err	Marginal Effect	Coef.	Std. Err	Marginal Effect
Constant	-0.368	2.132		4.194	1.876	
Household size	0.224	0.328	0.003	0.347	0.300	0.024
Experience in dairy farming	0.100*	0.053	0.005	0.060	0.046	0.002
Non/off farm income	-1.744**	0.870	-0.036	-2.458***	0.829	-0.163
Livestock size excluding dairy cow	-0.028	0.133	0.011	-0.344*	0.179	-0.031
Access to marketing information	0.703	0.899	0.079	-0.652	0.709	-0.089
Membership to milk cooperative	3.637***	0.904	0.353	-1.974*	1.065	-0.327
Access to credit	-2.915*	1.728	-0.133	-2.244	1.417	-0.097
Distance to nearest milk market	-0.014	0.151	-0.009	0.200	0.137	0.019
Contact with livestock extension agent	-0.338	1.044	0.041	-1.710*	0.902	-0.147
Non-contract was set as a base outcome. Obs. 121; LR χ^2 (18) = 124.29. Prob > χ^2 = 0.0000; Pseudo R^2 = 0.5211; ***, **, and * are significant levels at 1%, 5% and 10% significance level.						

Source: Own computation from survey result, 2016.

4.8.5 Determinants of Milk Market Outlet Choices at Point of First Sale

Multinomial Logit Model was used to estimate the factors affecting the choice of milk market outlets at point of first sale of milk by the dairy producer households. Before the analysis was carried out, the MNL model was tested for the Independence of Irrelevant Alternatives (IIA) using Hausman Test of IIA assumption. The χ^2 of the Hausman test is greater than zero indicating that the test fulfills the IIA assumptions of the MNL model and proved that there was no violation of the assumptions (Appendix Table 10) and therefore the application of the MNL model is appropriate. The dairy producers choose any of the three channels. The first choice is selling to traders, cafeterias, restaurants and hotels and was categorized under the “Market” and is assigned the value 0. The second choice is selling directly to milk consumers and was assigned the value 1. The third market outlet choice is selling to dairy cooperatives and/ or milk processors and was assigned the value of 2. Hence there are 0, 1, & 2 market outlet choices for the dairy producers. The category under “Market” was used as a comparison (base outcome) choice. The Wald χ^2 with appropriate degrees of freedom is 73.58 with a p-value of 0.0000 which is significant at 1% significance level. The Pseudo R^2 for the model is 0.5063 indicating the specification fits the data well and the variables included in the model explain 50% of the variation in choosing different milk market outlet choices at point of first sale. Among the explanatory variables used in the MNL model, three variables were found to affect the consumer market outlet choices and four variables affect the dairy cooperative and/or milk processors (Table 49).

Sex of the Respondent (SER): Sex of the dairy producer affected negatively and significantly the probability of dairy producer to choose dairy cooperative/milk processors as point of their first sale for milk sale at 5% significance level. Being male had decreased the probability of choosing dairy cooperatives/milk processors by 24.2% as compared to the base category. This may be because female-headed households are less likely to search other markets because they tend to be confined at home as compared to male headed households and this hinders them from searching other alternative market.

Education Level of the Household Head (EDUC): This variable increases the likelihood of the dairy producer to choose dairy cooperative/processors as a point of first sale for their milk. The variable affected positively and significantly the likelihood of the dairy producer to choose dairy cooperative/processors at 1% significance level. This might be due to the

reason that increase in education level increases the awareness of using formal marketing systems rather than informal marketing systems especially for perishable products like milk. As the education of dairy producer increases from one education level to the next level, the likelihood to use dairy cooperative/processors market outlet increases by 10.6% as compared to the base category. This finding is consistent with the work of Mutura *et al.* (2015) who found that level of education increases the likelihood of dairy smallholder farmers to sell to cooperatives in their study of analysis of determinants of market channel choice among smallholder dairy farmers. It is also consistent with the findings of Sharma (2015) in his study of determinants of small milk producers' participation in organized dairy value chains who found education level positively associated with choosing cooperatives.

Price of Milk in Kebele (PMILKK): As expected, this continuous variable was associated positively with choosing consumer market outlet choice significantly at 10% significance level but associated negatively and significantly with choosing dairy cooperative/processor market outlet choice at 1% significance level. This is consistent with the findings of Berhanu *et al.* (2013) in their study they found that the likelihood of accessing cooperative milk market outlet decreased with milk price increase as compared to accessing individual consumer milk market outlet. With increase in price of milk by one birr in kebele increases the probability of choosing consumer outlet by 14.3 % whereas it decreases the probability of choosing dairy cooperatives by 27.3%.

Access to Marketing Information (ACCINF): This dummy variable was negatively and significantly associated with choosing consumer as market outlet choice at 5% significance level whereas it is associated positively and significantly with choosing dairy cooperatives/milk processors at 10% significance level. The coefficients in the marginal effect indicate that having access to market information decreases the probability of dairy producer to choose consumer market outlet by 22.6% as compared to the base category. This result is contrary to the findings of Jari and Frases (2014) and Mutura *et al.* (2015) who found that access to market information increases the likelihood of selling to informal markets such as directly selling to consumers. The marginal effect result also showed that as the probability of obtaining market information increases, the probability of choosing dairy cooperative/milk processor as their market outlet increases by 20.3% as compared to the base category. This may be due to that acquiring access to market information may help them to sell their milk in a formal way of marketing systems. This result is consistent

with the findings of Jari and Fraser (2014) who found that households were most likely to increase participation in formal markets like selling to cooperatives/processors with the availability of accessing market information. Mekonin (2015) in his study of determinants of market outlet choices for coffee producing farmers, he found that access to market price information increased the likelihood of choosing cooperative outlets.

Distance to nearest milk market (DISTNMKT): It affected the probability of choosing the consumer market outlet positively and significantly at 5% significance level. The marginal effect indicates that, other things being constant, as the distance to nearest milk market increases by one kilometer, the dairy producer's likelihood of choosing consumers as point of first sale increases by 2.8% as compared to the base outcome. This might be due to the reason that as distance to market increases, the dairy producers sell to the nearby milk consumers in order to reduce the risk of spoilage and cost that may result in transporting it to other alternatives in distant areas.

Table 49. Factors affecting milk market outlet choice at point of first sale

Variables	Consumer			Dairy Cooperatives/ Processors		
	Coef.	Robust Std.Err.	Marginal Effect	Coef.	Robust Std.Err.	Marginal Effect
Constant	-3.004	4.515		29.573	6.699	
Sex of the respondent	0.690	1.153	0.144	-2.542**	1.023	-0.242
Education level of the household head	0.312	0.340	-0.016	1.348***	0.287	0.106
Household size	-0.140	0.239	-0.021	0.265	0.232	0.027
Experience in dairy farming	-0.065	0.045	-0.005	-0.020	0.049	0.000
Non/off farm income	0.723	0.904	0.098	-1.037	0.748	-0.113
Price of milk in kebele	0.524*	0.304	0.143	-2.964***	0.644	-0.273
Access to marketing information	-1.960**	0.786	-0.226	1.611*	0.959	0.203
Access to credit	-1.198	1.131	-0.052	-1.681	1.432	-0.106
Distance to nearest milk market	0.251**	0.106	0.028	-0.166	0.111	-0.022
Other Market was set as a base outcome. Obs. 121; LR χ^2 (18) = 73.58. Prob > χ^2 = 0.0000; Pseudo R^2 = 0.5063; Log Pseudo likelihood = -59.526801; ***, **, and * are significant levels at 1%, 5% and 10% significance level.						

Source: Own computation from survey result, 2016.

4.8.6 Determinants of Default of Contractual Agreement in Milk Marketing

Binary Probit Model was employed to identify factors that determine default in contractual agreement in milk marketing. The likelihood ratio indicated by χ^2 statistics is highly significant at 1% confirming the model has strong explanatory power (Table 50). The Pseudo R^2 is 0.1932 with a Log Likelihood of -58.09889. Among the twelve explanatory variables used in the model, seven variables were found to affect the contractual default significantly.

Sex of the Respondent (SER): The dummy variable sex affected the default of contract negatively and significantly at 10% significance level. This may be because the female respondents tend to search for other alternatives which they think that has better price for their milk than the male respondents whereas male respondents prefer to stay with the contract. As the respondent is being male, the probability of occurring default in contractual agreement decreases by 27.5%.

Experience in dairy farming (EXPDAIRY): As the prior expectation, this variable affected the default of contractual agreement in milk market positively and significantly at 1% significance level. This may be due to the reason that as the dairy producer gets more and more experience in dairy farming, he may develop searching for other milk market options and may not want to depend on single contract agreement. The coefficient of the marginal effect in the model indicates that as the dairy producer adds one more year in dairy farm experience, the probability of making default in milk market increases by 2.3%.

Price of Milk in Kebele (PMILKK): As it was expected, this variable affected the default in milk contractual agreement positively and significantly at 10% significance level. As there is high price in the kebele, the respondents may want to leave the contract and tend to shift to other agent who pays a high price incentive. The coefficient of the marginal effect shows that as the average price in kebele increases by one birr, the likelihood of breaching contractual agreement increases by 10.5%.

Volume of Milk Marketed (VMM): As its prior expectation, the volume of milk marketed affected the default in contractual agreement negatively and significantly at 10% significance level. Respondents which sell more milk are less likely to breach contractual agreement than respondents with less milk. This is because with the increase in milk to be marketed, respondents need sustainable market for their milk due to the perishability nature

of the product whereas buyers need reliable supply of milk and this benefits both parties so they may not dare to breach the contract. As the volume of milk marketed increases by one liter, the probability of default in contractual agreement decreases by 1.9%.

Membership of the respondent to other Collective Action Group (MCAG): This dummy variable affected the default in milk contract negatively and significantly at 10% significance level. As the respondent became member to other collective group, he may acquire knowledge from the group members focusing on the advantage of staying in contract and the consequences and disadvantages of contract default and this decreases the probability of default. As the marginal result indicates, being member to other collective group decreases the probability of default in contractual agreement by 23.3%.

Access to credit (ACREDIT): Increasing access to credit decreased the default of contractual agreement negatively and significantly at 10% significance level. With increasing access to credit, the dairy producer may get additional income (credit) that fulfills his financial shortages and he may decline to shift to other milk market alternatives and prefers to stay in the contract. The coefficient of the marginal effect result indicates that having access to credit decreases the probability of happening default by about 37.9%.

Contact with livestock extension agent (CONLEX): As prior expectation, this dummy variable affected the default in contractual agreement positively and significantly at 1% significance level. Contact with livestock extension agent helps the dairy producers in acquiring information on production and marketing of milk. This additional information may assist the dairy producers in searching other market alternatives in need of higher milk price and he may leave the contract. The coefficients in the marginal effect depicts that having contact with livestock extension agent increases the probability of breaching contractual agreement by 38.4%.

Table 50. Factors affecting default of contractual agreement in milk marketing

Variables	Coefficient	Std.Err	P> z	dy/dx
Constant	-2.418	1.737	0.164	
Age of the household head	-0.005	0.016	0.756	-0.002
Education level of the household head	0.087	0.124	0.481	0.035
Sex of the respondent	-0.712*	0.407	0.08	-0.275
Experience in dairy farming	0.058***	0.021	0.005	0.023
Price of milk in kebele	0.263*	0.145	0.07	0.105
Total land holding	-0.182	0.165	0.270	-0.073
Volume of Milk Marketed	-0.048*	0.025	0.057	-0.019
Household access to marketing information	0.456	0.338	0.177	0.178
Membership to other collective action group	-0.599*	0.323	0.064	-0.233
Access to credit	-1.051*	0.535	0.05	-0.379
Distance to all weather road	0.154	0.110	0.160	0.061
Contact with livestock extension agent	1.065***	0.404	0.008	0.384
Obs = 104; LR χ^2 (12) = 27.82; Prob > χ^2 = 0.0059; Pseudo R^2 = 0.1932; Log likelihood = -58.09889; y = Pr(DND) (predict) = .47586069; ***,and * are significant levels at 1%, and 10% significance level.				

Source: Own computation from survey result, 2016.

4.9 Challenges and Opportunities in Dairy Production and Marketing

4.9.1 Challenges in Dairy Production and Dairy Marketing

4.9.1.1 Institutional impediments/problems in dairy production and marketing

Dairy marketing includes many direct and indirect actors and through the course of its activities, dairy marketing is faced with many institutional and other impediments. For this reason, the sample dairy producers have mentioned some institutional problems or impediments in dairy marketing. Among the sample dairy producers, 67(41.9%) of them reported the existence of institutional problems or impediments regarding dairy marketing while the rest 93(58.1%) of them have reported the absence of institutional impediments. The types of institutional impediments that they reported are summarized in Table 51.

The absence or shortage of legal protection in case of cheating on price and on weighting scales was considered as an institutional problem/impediment in the dairy marketing by 44 (65.67%) and 39 (58.21%) of the sample respondents respectively. According to the dairy producer households, this institutional problem was mostly observed in butter trading in that the traders cheated the dairy producers on the current market price. They were also cheated by traders especially by the village butter traders on weighting while collecting butter in the district market towns. The dairy producers claimed that there was no legal

protection to correct such opportunistic behaviors of the traders. The focus given to the livestock sector was mainly on the production side but it lacked focus on marketing of dairy products. There is no any proclamation focused on milk and milk product marketing but the only proclamation regarding livestock was on Live Animals Marketing Proclamation issued in 2014 (Proclamation No.819/2014) in the country. The other proclamation issued by the government was Cooperative Societies Proclamation No. 147/1998 that focuses on establishment of different cooperatives. Even in this Cooperative proclamation, milk cooperative was not given special focus but it was with in agricultural cooperative societies. Instead, Fishery Cooperative Society which has less coverage and employment capacity than dairy sector in the country was mentioned stand alone in the proclamation.

Lack of complete land ownership security was another institutional constraint for dairy production in the study area. In Ethiopian case, land is the property of the government and farmers have the right to use it, hence increasing land availability for animal feed production depends on security of land use rights (MoA and ILRI, 2015). The lack of land ownership security as institutional challenge for dairy production was raised by the group discussion participants especially in the urban sample kebeles. Some of the dairy farmers found in the urban kebeles (e.g. In kebele 13) were unable to renew the license for the land they used for dairying and this created treat and were feared that the government may displace them to areas outside the city and there they can't find market for their milk. Some dairy producers were also reported that they were restricted by the Bahir Dar City municipality administration to construct temporary shelters around their compound (backyards) to prevent their cows from direct sunlight and rain. Many of the respondents in urban kebeles live together with their livestock in crowded area which is inconvenient place for both the people and their livestock.

Another institutional impediment raised by the sample dairy producers was cultural influence. Out of the total respondents who have reported the existence of institutional impediments in dairy marketing, 26.87% of them mentioned that cultural influence was considered as institutional problem. Their main argument was that the habit of drinking milk was not developed in the society. Netherland-African Business Council-NABC (2009) had also confirmed that combination of cultural and economic factors are the main reasons for the low consumption of milk in Ethiopia. People don't hesitate to pay much money for alcohol drinks but they failed to pay for dairy products such as milk. Even

though it is decreasing nowadays, the other cultural influence reported by some dairy producers was that selling milk was considered as bad culture and if they do so, they believe that their cows will ill.

The limited number of suppliers for feed and improved cow breeds was also considered as an institutional problem. As it was raised by the sample respondents and group discussion participants, concentrate feeds and improved cow breeds were the major constraints/challenges faced the dairy producers. This was mainly due to the existence of very few suppliers for both inputs mostly the government and private traders and cooperatives (only for the members). Institutions and organizations such as the milk cooperatives were not in a position to fill the gap of input shortages in the study area. Infrastructures especially roads and electricity were also considered as problems in dairy marketing in the study area. Even the districts are nearby to Bahir Dar city, the road from Bahir Dar Zuria to Bahir Dar city was rugged and inconvenient to transport dairy products. Lack of electricity along with power shortage and power interruption was also considered as impediment as the cooperatives/processors depend on it to process milk and milk products.

Another problem raised by the dairy sample respondents was domination of marketing by few organizations. It was raised by 46.27% of the respondents who confirmed the existence of institutional problems. The dominance was by few cooperatives for milk marketing and village traders for butter marketing. Since there were no many processors and cooperatives and other organized buyers of milk, the dairy producers have no other alternatives to sell out their products especially milk. They have less bargaining power for their milk and were forced to sell for what the cooperatives and buyers decide.

Table 51. Type of institutional impediments reported regarding dairy marketing

Institutional impediments/problems	Whether it is considered as institutional impediment or not		
	Response	N	%
Whether there are institutional problems or impediments regarding dairy marketing?	Yes	67	41.88
	No	93	58.13
Absence or shortage of legal protection in case of cheating on prices	Yes	44	65.67
	No	23	34.33
Absence or shortage of legal protection from cheating on weighting scales	Yes	39	58.21
	No	28	41.79
Poor emphasis given to livestock sector	Yes	51	76.12
	No	16	23.88
Cultural influences	Yes	18	26.87
	No	49	73.13
Input supply problem	Yes	40	59.70
	No	27	40.30
Infrastructural (road, telecom, electricity)	Yes	34	50.75
	No	33	49.25
Incomplete property rights on land	Yes	27	40.30
	No	40	59.70
Domination of marketing by few organizations	Yes	31	46.27
	No	36	53.73

Source: Own survey result, 2016.

In addition to institutional impediments, a number of other challenges (constraints) in the dairy production and dairy marketing were identified in different dairy marketing actors in the study area. The challenges raised by the major dairy marketing actors are discussed in the following sections.

4.9.1.2 Challenges for dairy producers in dairy production

Sample dairy producers and group discussion participants had mentioned many dairy production and dairy marketing constraints/challenges. Some of the challenges/ constraints mentioned by the dairy producers and group discussion participants were discussed below.

About 69 (43.1%) of the sample dairy producers and the group discussion participants mentioned the shortage of feed as their first constraint for dairy production in the study area (Table 52). Solomon (2014) and Azage *et al.* (2013) also confirmed the feed shortage

as a major constraint in milk production. Ministry of Agriculture-MoA and International Livestock Research Institute-ILRI (2013) has also reported the livestock feed shortage as a crucial in both highlands and lowlands where grazing land was scarce. The shortage of feed includes both agro-industrial concentrate feeds and improved forages. Shortage and low quality of concentrates such as wheat bran and oil seed cakes were among the major problem in the study area. The concentrate feeds were most of the time supplied by private traders and by cooperatives (only for its members). The group participant producers have reported that the price of feed sometimes reached up to 7.5 ETB/kg. The problem was not only because of its expensive price, but also its quality was poor. According to them, the feed was sometimes mixed with other materials and they found that it was hazardous for their livestock. The other problem relating to the concentrate feeds were shortage of supply. The dairy producers were not able to find enough supply as the source of supply was controlled by private traders and no other alternative suppliers other than cooperatives (and these cooperative supplies only to its members). The sample dairy producers had also confirmed that shortage of supply and expensive price of concentrates were major constraint for dairy production in addition to shortage of improved forages. Even though the Woreda office of Agriculture and Rural development have distributed improved forages such as vetch, oat, and alfa-alfa, still the demand exceeds the supply of improved forages.

According to the sample respondents and group discussion participants, the demand for improved cross breed cows is very high in the study areas. However, there is shortage of supply of these cows (Table 52). About 28.1% (45) of the sample dairy producer mentioned the shortage of improved cross bred dairy cows. Due to this supply shortage, the high price for dairy cows was not easily affordable by the dairy producers (for example, the price of cross breed cow at the survey year was up to 35,000 Birr). AI service in the study area was not given as required both in its coverage and in its effectiveness. Both the reports from group discussion and sample respondent dairy producers claimed that besides the shortage of supply of improved cows, the breeding service given by AI was not effective either due to delaying of the service on the time of heating period of the cows, or due to ineffectiveness of the semen. MoA and ILRI (2013) has also found that the low level of livestock productivity mainly due to inefficient AI service delivery led to shortage of improved livestock breeds. The other issue raised by the participants and sample respondents was lack of enough livestock breeders in the study area and because of this,

the dairy producer were forced to use private breeders but they were asked high price per service (that is, up to 120 ETB per service as it was compared to 4 ETB by the government).

Shortage of training was another constraint raised by the dairy producers. The dairy producers in the study area obtain training mainly from government through extension agents found in the district's Office of Agriculture and Rural Development. Both the group discussion participants and the sample dairy producers have reported that the training given by the development agents was not enough and most of the time it was focused on crop production and natural resource (soil and water conservation). Even if it was given on livestock production, the dairy producers and group participants reported that the training didn't cover whole issues about dairy cow production such as modern type of feeding using different feed rations and preparation of molasses, processing of milk and milk products that could stay for long periods before it reaches the market, as well as training about how and when to sell milk and milk products and so on.

Veterinary services in the study area were given by the government and private veterinarians. The respondents and group discussion participants claimed that no immediate action or responses are given by the veterinarians for the report about the occurrence of disease in the area. Veterinary service was not provided in the nearby areas so they have to travel to district towns to obtain this service. Due to traveling long distance, death of animals was occurred along the journey.

According to the survey result, the current average grazing land of sample respondents was 0.21hectare. As per the group discussion participants and sample respondents, the size of grazing land in the study area was declining from time to time. Among the major reasons for declining of the grazing lands are the expansion of cropping lands such as for vegetables due to irrigation projects and allocating of land to other cash crops such as '*chat*'. Prohibition of free grazing lands was another important issue raised by the group discussion participants and by sample respondents. This regulation has forced them to decrease their livestock such as dairy cows and they claimed that this livestock reduction caused milk production. But some producers had seen this regulation as an advantage to decrease cow number and focusing on increasing productivity of milk per cow. Limited access to water for livestock was also considered as one of the challenging factors in livestock production. Animals travel long distance for searching drinking water in many

rural areas. This problem was raised by the dairy producer group discussion participants especially in Huletu Yigoma and Sebat Amit kebeles. They have reported that the water found in these kebeles was not pure and this exposed the animals to different diseases such as *bilharzia*.

The sample dairy producers and the group discussion participants also reported that there was lack of capital especially for the low income groups. The survey result revealed that the major /the dominant source for credit requirement was ACSI microfinance. Even if this microfinance was accessible by majority of the dairy producers, the high interest rate (which is 15%) charged by this microfinance prevented them from exploiting this opportunity. Banks and microcredit institutions couldn't be easily accessed by resource poor farm households to participate more in milk production and improve their milk supply.

Table 52. Challenges facing the dairy producers during dairy production

Challenges in dairy production	N	%
Shortage of feed	69	43.1
Shortage of improved breeds	45	28.1
Lack of dairy production training	25	15.6
Lack of dairy product handling training	9	5.6
Lack of capital	6	3.8
Shortage of grazing land	2	1.3
Lack of veterinary services	2	1.3
No Challenges in Dairy Production	1	0.6
Livestock disease	1	0.6
Total	160	100

Source: Own survey result, 2016.

4.9.1.3 Challenges for dairy producers in dairy marketing

The other constraints raised by the sample respondents and group discussion participants were dairy marketing constraints among which the following were the major ones.

Lack of market linkage with different milk buyers was the major problem regarding dairy marketing. About 39 (24.4%) of the sample dairy producers have reported lack of market linkage as their major problem in dairy marketing (Table 53). The producers were unable to produce more milk due to lack of buyers. This problem was not raised only by the non-member producers but also by cooperative members who didn't sell their milk at night times due to the shortage of full functioning of their cooperatives to receive the milk

produced by their members (except members of Bahir Dar Dairy Development cooperative which receive milk from its members twice a day). The perishability nature of milk has its own effect on marketing it by transporting to nearby towns or the city. In case they tried to sell it in spot market, it easily exposed to spoilage and consumers refuse to buy because they hesitate on its quality. Then the producers' only alternative was to return it back to home and they process it to different milk products such as butter or *Ayib* (local cheese). According to the producers, there are no milk collection centers that receive from producers and sell to milk processors. The producers have great difficulties in finding buyers and spent a lot of time in searching for milk buyers. Especially the non-members of milk cooperative dairy producers reported that they spent more time and cost in search for milk buyers due to lack of milk traders. The dairy producers strongly explained that this phenomenon discouraged them not to expand their milk production and forced them to shift to other economic activities such as producing cash crops.

Market/demand fluctuation was another challenge raised by the dairy producers. Since milk is among the food stuffs which is restricted by the Christian Orthodox followers not to be consumed during fasting periods, its demand declines drastically during these periods. Due to the nature of its perishability, milk can't be stored for a long time and it spoils quickly unless it arrives to its consumers on time. The milk produced during these fasting periods then has no demand and the dairy producers either forced to sell it with low prices or try to process it to other products or it is left to be fed by the calf. It is obvious that demand fluctuation causes price uncertainty. According to the group participant and sample dairy producers, the price of milk declines up to 5 Birr / liter during fasting periods and during rainy periods in which the availability of feed such as grass increases and this boosts milk productivity per cow. The fluctuation of demand and price discouraged the dairy producers from increasing milk production.

Lack of milk processing plants/ or cooperative plants was raised by almost all group participants as the first constraint in the study area. In addition to small number of milk processors in the study area, they all are located in Bahir Dar City and they are not accessible by the dairy producers especially who live in the rural kebeles. The dairy producers are so far from the city and they couldn't transport their milk to the city easily due to bad roads (especially from Huletu Yigoma and Sebat Amit Kebeles to Bahir Dar city). Even though Bachima and Enamrit kebeles (which are found in Mecha district) have access to asphalt road, it is 30 km away from Bahir Dar city and there are no milk traders

to collect and transport the milk to processors found in Bahir Dar city. Besides the bad transport condition in some kebeles, the processors don't process with their full processing capacity and, they can't accommodate all the milk coming from the producers. Because of this and others, the dairy producers were discouraged to produce more milk and supply to the market. Another challenge raised was product deterioration (spoilage of milk). This was mainly caused by poor hygiene, breaching of contracts with buyer, cow disease, hot weather condition, lack of buyer during fasting periods, and so on.

Focus group discussion dairy producers especially in Bahir Dar Zuria and Bahir Dar city had also raised lack of permanent selling places for their dairy products as challenge in dairy marketing. The group discussion participants in Bahir Dar Zuria reported that sometimes they were prohibited and unable to sell their milk and butter in the market days of their locality by the local police agents for the reason that it should be sold at separate market place but the local administration couldn't locate permanent selling places for selling dairy products. In addition to this, the producers also reported theft problems during the marketing days and absence of security in the market area for the dairy producers. The producers in urban kebeles were also claimed that there were restrictions by the municipality administration to construct containers to sell milk. This issue was also confirmed by the cooperative in the city that it was unable to open additional milk selling containers due to the restriction of using containers in the city by the municipality.

As per the focus group discussion, the Shortage of good road infrastructure was especially the constraint in the sample kebeles of Bahir Dar Zuria. The road from this district to Bahir Dar was very rugged and dusty. The producers (especially the non-members of cooperatives) couldn't transport their milk easily to the city both due to high transportation cost and inconvenient road that contributes to milk spoilage during transportation. This bad road condition hindered them from reaching to the city easily and they were unable to sell milk and butter.

Some cooperative member dairy producers claimed the refusal of their milk by cooperatives for the reason of poor quality and shortage of demand as a challenge for their dairy marketing. But the group discussion participant dairy producers complained that even they bring good quality milk, the cooperatives refused not to accept the milk and they forced to return it back to home. The producers criticized the enforcement of laws or by-laws of the cooperatives which should be enforced according to the rule. They also claimed

that the cooperatives reduce the price of milk without the consensus and will of the members.

Table 53. Challenges the dairy producer face during dairy marketing

Challenges in dairy marketing	N	%
Shortage of marketing linkages	39	24.4
Demand fluctuation	35	21.9
Price uncertainty	23	14.4
Lack of cooperatives and/or processors	18	11.3
No awareness about challenges during dairy marketing	18	11.3
Product deterioration	13	8.1
Unreliable buyer	11	6.8
Cheap price of milk	1	0.6
Untrusted customer	1	0.6
No problem in dairy marketing	1	0.6
Total	160	100

Source: Own survey result, 2016.

4.9.1.4 Challenges for traders in dairy marketing

Out of the total trader respondents sampled for the study, 25 (83.3%) of them reported the existence of challenges in dairy marketing. Among the challenges mentioned by the traders were high tax rate, financial problem, lack of permanent selling place, price fluctuation, low demand especially during fasting periods, lack of transport, lack of market linkages, expansion of unlicensed traders, and lack of cooling centers (Table 54).

Table 54. Major constraints of traders in dairy marketing

Major constraints	N	%
Tax increase	6	24.00
Financial problem	4	16.00
Lack of permanent selling place	3	12.00
Lack of transport	2	8.00
Price fluctuation	2	8.00
less number of customers	2	8.00
Others*	6	24.00
Total	25	100.00

*Others include lack of marketing linkage, lack of butter preservation equipment (coolers), expansion of unlicensed traders, low quality of butter, and low demand during fasting periods.

Source: Own survey result, 2016.

4.9.1.5 Challenges for consumers in milk marketing

The consumers were faced with different challenges that occur during milk marketing. Among the major challenges in milk marketing raised by the consumers are discussed below.

The major problem raised by the consumers was Poor (low) quality of milk. The consumers reported that the quality of milk they bought was either adulterated with water or has low fat content. They have also reported that the dairy producers mix the fresh milk with milk stayed for long time. The consumers claimed that there were no standard quality controlling methods for milk marketing in the area. Another challenge raised by the consumer was the lack of standardized weighting scales. The consumers complained that the dairy producers sold milk with containers that has no standardized weighting gages but simply sale with containers without checking its accuracy. The decision to select the measuring container was of the dairy producers and the consumers accepted what the sellers decided.

Milk supply and price fluctuation was another challenge for consumers in the dairy marketing. The consumers claimed that there were times where there is good supply and times with low supply of milk. In the rainy season and fasting periods, the supply of milk increases, while in the dry and non-fasting periods, the supply declines. Moreover, the price of milk fluctuates within a year especially during fasting and non-fasting periods. During the fasting periods, price of milk declined up to 5birr/liter whereas during the non-fasting periods, there were times in which the price raised up to 15birr/liter. According to the consumers, price fluctuation was due to lack of market linkage that links the producers and consumers and other buyers so as to create consistent supply with stable price. This can encourage the producers to produce more and satisfy the consumers or other buyers.

The consumers had also raised some institutional problems/impediments regarding dairy marketing. Among the institutional impediments raised were absence or shortage of legal protection in case of cheating on prices and weighting scales; infrastructural (road, telecom, electricity, etc.); input supply problem; poor government policy; and absence of quality controlling agent.

4.9.1.6 Challenges for milk cooperatives/milk processors

According to the cooperatives, major problems faced during milk collection and marketing were demand and price fluctuation, rise of input (feed cost), low quality of milk, low demand for milk, and lack of secured land ownership for the dairy producers in the urban kebeles. As per the experts in each cooperative, poor infrastructure (such as road; and low power, unreliable and interruption of electricity); and cultural/religious influences (such as less milk feeding habits and plenty of fasting periods) on milk consumption were the major problems/impediments faced in dairy marketing in the study area.

According to the processors, the major problems, faced during production/processing and marketing of their products were lack of capital to expand their production, lack of convenient working area/place for their processing plants, lack of quality milk supply, and demand/price fluctuation for their products.

They mentioned the financial problem as first problem and they reported absence of special focus given for milk processors. They also complained the long bureaucratic process to borrow money from financial institutions and the requirements for collaterals and this has created difficulties in filling the gap of their financial shortages. Another problem raised by the processors was high tax rates imposed that doesn't consider their incomes. Lack of good infrastructure such as electricity was another series constraint reported by the processors. This electric power shortage and interruption caused big loss in their business since milk is highly perishable unless it is processed to different products on time. Moreover, lack of focus for dairy production, cultural /religious influences of drinking milk, and incomplete property rights on land ownership to dairy producers (this decreases milk supply and in turn it causes inconsistent supply of milk to the processors) were other institutional impediments raised by the milk processors

4.9.1.7 Challenges for cafeterias/restaurants/hotels

Of the total sample cafeterias/restaurants/hotels, 9 (40%) of them have reported that there were institutional problems/impediments regarding milk (dairy) marketing. These include cultural /religious influences such as less milk consumption habits by the local communities and religious influences during fasting periods, lack of quality control for milk, absence or shortage of legal protection from cheating on weighting scales, poor

infrastructures (such as roads, telecommunications, electricity), and lack of input supply to producers to boost their milk production.

4.9.2 Opportunities in Dairy Production and Marketing

Group participants and sample dairy producers, cooperatives/processors and traders have expressed their bright future or opportunities in dairy marketing and dairy production. Some of the major opportunities were the followings.

Expansion of infrastructures: Such as roads, telecommunications and expansion of electricity were among the opportunities that could create favourable conditions for dairy production and marketing. The roads were being expanded and improved from time to time and the accessibility to Bahir Dar city was being increased. The good infrastructure enables the dairy producers to get inputs from suppliers and this can increase their milk production. These infrastructures can also help them in searching and to communicate with milk and butter buyers. With good road, they can easily transport dairy products to nearby city on time.

Availability of dry fodders and expansion of flour (milling) factories: According to the dairy producers and group participants, there were plenty of dry fodders such as straw and maize stalks in the rural kebeles. But these need to be palatable by processing them to different forms. The expanding flour (milling) factories were other opportunities for filling the gap of feed shortages such as wheat bran which was raised as major agro-industrial feed shortage.

Increasing urban population: The expansions of cities and population growth have been seen as future opportunities for the dairy producers. The increase in demand for dairy products due to population growth can encourage them to produce milk and milk products and increase their earning from selling these products. Opening of education institutions such as new universities campuses were also seen as an opportunity hoping opening new dairy product markets. Increase in tourism conference in the area especially in Bahir Dar City was also seen as an opportunity for dairy marketing by traders.

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Institutional arrangement and/or institutional environment play a crucial role in facilitating any marketing in general and in dairy marketing in particular and increase satisfaction to actors in the dairy marketing. As market exchange increases, there should be effective institutional set-ups that facilitate transaction of products especially products that need immediate exchange due to their nature of easily exposed to spoilage such as milk and milk products. These kinds of products need modern type of institutional arrangements such as formal contractual arrangements in order to create reliable and quality supply. Institutional arrangements create order; hence, they reduce conflicts and ensure mutual benefits. Despite the importance of institutional set-up in dairy marketing, the existing situation and problem with in this set up was not yet studied. Thus, this study was aimed to analyze the institutional environments and arrangements in dairy marketing in Bahir Dar Milk Shed area in West Gojam Zone of the Amhara National Regional State (ANRS) with the specific objectives of examining the institutional environments and arrangements; identifying factors that affect milk market participation and level of participation of dairy producers; assessing the contractual agreement using of dairy producers and identify the determinant factors; identify milk and butter marketing channels and determinants of milk market outlet choices at point of first sale; and to identify determinants for breaching contractual agreement in milk marketing.

The study was carried out in three districts in Bahir Dar Milk shed area including Bahir Dar city (Bahir Dar Liyu), Bahir Dar Zuria, and Mecha district taking two kebeles in each district hence a total of six kebeles. Primary data was collected from a total of 160 dairy producer households; 30 butter and/or milk traders; 27 consumers, 20 cafeterias/restaurants/hotels, 3 cooperatives, and 3 processors. In addition to these, discussions with dairy producers' and traders' focus groups, organizations/institutions, and key informants were also made.

Both descriptive and econometric methods were used for data analysis. In the descriptive part, the demographic and socio economic characteristics of sample households with their institutional factors were discussed. In addition to this, the potential variables used in

econometric models were tested for their statistical difference using t-test, Chi²-test and one way ANOVA (Analysis of Variance).

In the econometric part, the study used econometric models including Heckman two-stage econometric estimation procedure, Probit Model and Multinomial Logit Models. SPSS Version 20 and STATA version 13.1 software packages were used for data analysis.

The study has revealed that due to lack and weak functioning of formal institutions, the informal institution, that is, trust was found to be dominant and govern the dairy marketing in the study area. Eight main marketing channels for milk and ten main marketing channels for butter were identified in the study area. Moreover, the study has also indicated weak linkages among the different actors in milk marketing. It was found that among the transaction costs, the transaction cost related with searching trading partners, screening trading partners and searching price information were the highest both for dairy producers and traders and this had implied the lack of market linkages.

In the econometric part of the study, it was found that price of milk in kebele, access of the respondent to marketing information, total land holding size of the dairy producer, and membership to dairy cooperatives positively and significantly affected the milk market participation (MMP) of the dairy producers whereas sex of the respondent negatively and significantly affected the MMP decision. Education level of the household head, experience in dairy farming, and livestock size excluding dairy cows were found to affect the volume of milk marketed (VMM) positively and significantly whereas sex of the respondent, household size, total land holding size and access to credit affected negatively and significantly the VMM.

In the contract or non-contract (CONC) using of dairy producers to sell their milk, experience in dairy farming and membership to milk cooperative affected positively and significantly; whereas non/off farm income and access to credit affected negatively and significantly the CONC using behavior.

Among the variables used in the probability of default in contractual agreement, experience in dairy farming, price of milk in kebele and contact with livestock extension agent affected positively whereas sex of the respondent, volume of milk marketed, membership to other collective action group, and access to credit were found to affect negatively and significantly the probability of default.

Six variables were found to affect the formal, informal, or non-contract arrangement (FINC) choice decisions of dairy producer households among them experience in dairy farming and membership to milk cooperative affected the choice of formal contractual arrangements positively whereas non/off farm income and access to credit negatively and significantly affected the dairy producer's choice for formal contractual arrangement as compared to the base category. Livestock size excluding dairy cows, membership to milk cooperative, and contact with livestock extension agent affected negatively and significantly the probability of choosing informal contractual agreement whereas non/off farm income affected negatively and significantly both formal and informal contractual agreements as compared to the base category.

In the milk market outlet choice at point of first sale (MKTOC), price of milk in kebele and distance to nearest milk market affected positively the probability of dairy producer's choice for consumers whereas access to marketing information negatively affected the dairy producer's choice for consumers as point of their first milk sale as compared to the other market which was used as a base category. Sex of the respondent and price of milk in kebele affected negatively the probability of dairy producer's choice for dairy cooperatives/processors whereas education level of the household head and access to marketing information positively affected the dairy producer's choice for consumers as their point of first sale compared to the base category.

Many institutional, production and marketing challenges/constraints were identified in the study area. Absence or shortage of legal enforcement, lack of emphasis to dairy sector, cultural influence, incomplete property rights on land, lack of standard quality and weighing measures were among the institutional constraints. Production constraints such as shortage of feed, shortage of improved dairy cross breed cows, shortage of training, and shortage of grazing lands were among the major ones. Moreover, lack of market linkages, demand and price uncertainty, shortage of milk processing plants/milk cooperatives, and lack of permanent milk and butter selling places were also identified as the major challenges in dairy marketing.

Opportunities such as expansion of infrastructures such as roads; availability of dry fodders and expansion of flour factories; and increasing urban population were among the major opportunities raised by the different dairy marketing actors.

5.2 Conclusion

The descriptive part of the study revealed that sample selected milk market participants as compared with non-participants were characterized by their education level, resource ownership, volume of milk produced and livestock size. Moreover, non/off farm income, and source of labor for dairy farming were associated with milk market participation of the dairy producers. Access to different institutions including access to market information, distance to all weather roads, and distance to nearest milk market were also found to be associated with sampled milk market participants. Similarly, volume of milk produced and marketed was associated with formal contractual agreement implying the need for stable market especially for perishable products such as milk to reduce the risk of spoilage in case demand for milk decreases. Education level and access to marketing information also showed positive significant association with choosing of formal marketing systems such as cooperatives/milk processors.

The study has also found that there was lack of formal institutions that govern dairy marketing except the rules and regulations in the cooperatives associated with members of the cooperatives. Due to the lack and ineffective functioning of the formal institutions, informal institutions such as trust dominate the dairy marketing in the study area. It was found that among the transaction costs, the transaction cost related with searching trading partners, screening trading partners and searching price information were the highest both for dairy producers and traders and this had implied the lack of market linkages. Moreover, the descriptive part of the study indicated the poor relationship among the dairy marketing actors suggesting the need for strengthening linkages for the betterment of dairy marketing.

5.3 Recommendations

The probit model result showed that access to market information positively and significantly affected the probability to participate in milk marketing. This implies information flows focusing milk market demand and price should be available to dairy producers to increase marketing participation and commercialization in dairy marketing.

Membership to milk cooperative was also associated with market participation and this implies that emphasis should be given to establish dairy cooperatives so as to increase milk market participation.

The second-stage Heckman selection estimation model result revealed that education level of the dairy producer positively and significantly affected the volume of milk marketed. This implies that increasing education creates awareness of benefits from selling and this leads to creating commercialized communities. Hence focus should be given towards educating dairy producers.

Being male has decreased the volume of milk marketed implying that, in addition to the female dairy producers, emphasis should be given to male dairy producers focusing the advantage of selling milk so as to increase volume of milk to be marketed.

Total land holding size negatively and significantly affected the volume of milk marketed. This implies that as the total land of the dairy producer increases, the dairy producer may shift the land to other agricultural activities such as crop production by giving less focus to milk production and marketing. Therefore, in addition to give more focus on the dairy producer households who have small land to increase their dairy business by increasing milk productivity per given area of land like intensive production systems, emphasis should be given to encourage the dairy producer households who have large land size to allocate land to dairy production so as to increase volume of milk to be marketed.

Being membership to dairy cooperative affected using contractual agreement significantly and positively. This implies that, being formal marketing system and institution, cooperatives serves as stable market destinations for producer households and emphasizes should be given to establish cooperatives and increase members to change the informal marketing system to formal marketing systems.

The Probit model result of the probability of default of contractual agreement in milk marketing revealed that being male headed households affected negatively and significantly the default of contractual agreements. This implies that contractual agreements should be focused on male headed households to avoid the risk of default. In addition to this, emphasis should be given to female dairy producers focusing on the awareness of the advantages of contractual agreement in milk marketing so as to avoid contractual default.

The result of the Probit model has also indicated that volume of milk marketed has decreased the probability of default in contractual agreement. This implies that contractual

agreements with households who sell large volume of milk is recommended than with households who have small volume of milk to be marketed.

Membership of the respondent to other collective action group affected negatively the probability of default of contractual agreement. Thus, the result implies that in addition to encouraging members to other collective action groups, emphasis should also be given to non-member individuals focusing on the advantages of contractual uses in milk marketing.

Access of the dairy producer to credit was found to affect negatively the probability of contractual defaults. This is because as the respondent has access to credit, his/her probability of using credit increases and thus, he/she dares not to make default in the contract he/she agreed with his/her customers. This negative association implies that contractual agreements need to be practiced in areas where credit is accessible.

The Probit model has estimated that contact with livestock extension service positively affected the probability of default in milk contractual agreement. This might be due to that the livestock extension agent may advise them to sell their milk for better prices. So, in addition to better milk prices, livestock extension system should be focused on creating awareness of the use of contractual agreement based marketing systems especially in perishable products such as milk to avoid the risk of loss due to spoilage that could come due to default in contractual agreements.

Experience in dairy farming positively and significantly affected the probability of dairy producers to choose formal contractual arrangements as compared to the base outcome implying that formal contractual arrangement should be practiced in households who have more experience in dairy farming to sustain continuous milk supply.

Membership to milk cooperative increased the likelihood of choosing formal contractual agreement as compared to the base category implying the need to establish milk cooperatives to change the dairy marketing system from informal to formal ones so as to follow the formal way of milk selling, that is, milk collection, processing, and distributing to end users keeping its standard quality.

The result in the multinomial logit model in milk market outlet choice at point of first sale depicted that education level of the dairy producer positively and significantly influenced the dairy producer's probability of choosing cooperatives/milk processors as compared to

the base category and this implies that emphasis should be given to expand education in the dairy producer households in order to shift the informal milk marketing system to formal marketing systems.

Being male has decreased the probability of choosing dairy cooperatives/processors at point of first milk sale. This result indicates that in addition to female dairy producers, emphasis should be given to male dairy producers focusing on the advantage of using milk cooperatives/milk processors so as to increase their probability of choosing cooperatives/milk processors participation at point of first sale for milk market.

Price of milk in kebele increased the probability of dairy producer's choice for consumers at point of first sale for milk market. This variable was also found to affect negatively the probability of dairy producers to choose cooperatives/processors implying the cooperatives did not pay high prices for their suppliers. Thus, milk cooperatives/milk processors have to pay premium prices for their suppliers so as to attract milk suppliers.

Access to marketing information was found to be associated with increasing the probability of dairy producer's choice for milk cooperatives/milk processors as their point of first sale for their products as compared to the base category. This result implies that emphasis should be given to increase market information for dairy producers to increase the probability of choosing formal marketing systems.

In addition to the important significant variables estimated by the econometric models, the study has indicated that there was lack and low level involvement of formal institutions in the dairy marketing. The dairy marketing is done mostly in a traditional way of trading with highly dependence on trust and mutual understanding. How the interaction between the formal and informal institutions can be used to improve market transaction is a challenge that must be given great emphasis. Moreover, besides focusing on important significant variables, policy makers should focus on devising appropriate regulations, formal rules and principles to govern the dairy marketing in the study area. In addition to this, efforts should be given to improve the market linkages in the study area.

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7. APPENDICES

Appendix Table 1. Variable inflation factor for continuous independent variables used in contractual or non-contractual agreement

Variable	VIF	1/VIF
Experience in dairy farming	1.49	0.672
Age of the household head	1.27	0.786
Household size	1.25	0.800
Livestock size excluding dairy cows	1.23	0.816
Distance to nearest milk market	1.03	0.972
Mean VIF	1.25	

Source: Survey data, 2016.

Appendix Table 2. Contingency coefficients for dummy independent variables used in contract or non-contract for selling milk

Variables	CC
Sex of the respondent	.115
Education level of the dairy producer	.154
Membership to milk cooperative	.238
Non/off farm income	.276
Access to credit	.054
Contact with livestock extension agent	.045
Mean CC	.0147

Source: Survey data, 2016.

Appendix Table 3. Variable inflation factor for continuous variables used in formal, informal, or non-contract using decision of dairy producers

Variable	VIF	1/VIF
Experience in dairy farming	1.28	0.780
Household size	1.22	0.822
Livestock size excluding dairy cow	1.21	0.824
Distance to nearest milk market	1.01	0.989
Mean VIF	1.18	

Source: Survey data, 2016

Appendix Table 4. Heteroscedasticity test for variables used in formal contractual agreement, informal contractual agreement, or non- contract in milk marketing.

hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of FINC

chi2(1) = 0.75

Prob > chi2 = 0.3871

Appendix Table 5. Contingency coefficients for dummy independent variables in formal, informal, or non-contract using decision of dairy producers

Variables	CC
Non/off farm income	.296
Access to marketing information	.352
Membership to milk cooperative	.637
Access to credit	.109
Contact with livestock extension agent	.230
Mean CC	0.325

Source: Survey data, 2016.

Appendix Table 6. Variable inflation factor for continuous variables used in milk market outlet choices at point of first sale

Variable	VIF	1/VIF
Experience in dairy farming	1.30	0.769
Household size	1.19	0.842
Price of milk in kebele	1.18	0.844
Distance to nearest milk market	1.01	0.989
Mean VIF	1.17	

Source: Survey data, 2016

Appendix Table 7. Contingency coefficients for dummy independent variables used in milk market outlet choice at point of first sale

Variables	CC
Sex of the respondent	.028
Education level of the household head	.419
Non/off farm income	.194
Access to marketing information	.419
Access to credit	.156
Mean CC	0.243

Source: Survey data, 2016.

Appendix Table 8. Variable inflation factor results of the continuous variables used in the probability of default in contractual agreement in dairy marketing

Variables	VIF	1/VIF
Price of milk in kebele	1.98	0.506
Total land holding	1.77	0.566
Experience in dairy farming	1.65	0.607
Age of the household head	1.52	0.657
Distance to all weather road	1.22	0.817
Volume of Milk Marketed	1.13	0.885
Mean VIF	1.54	

Source: Survey data, 2016.

Appendix Table 9. Contingency coefficients for dummy independent variables used in the probability of default in contractual agreement in milk marketing

Variables	CC
Sex of the respondent	.043
Education level of the household head	.081
Access to marketing information	.080
Access to credit	.167
Contact with livestock extension agent	.203
Mean CC	0.115

Source: Survey data, 2016.

Appendix Table 10. Hausman test of IIA assumptions for Multinomial Logit Model

Omitted	chi2	df	P>chi2	evidence
Market	-5.568	10	1.000	for H0
Consumer	4.135	10	0.941	for H0
Dairy_Co	-8.368	10	1.000	for H0

Source: Survey data, 2016.

Appendix Table 11. Heteroscedasticity test for variables used in default or non-default in contractual agreement in milk marketing

hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of DND

chi2 (1) = 0.20

Prob > chi2 = 0.6573

Appendix Table 12. Conversion factors used to calculate Tropical Livestock Unit (TLU)

Animals	TLU-equivalent
Ox, cow, and adult horse	1.00
Bull and heifer	0.75
Weaned calf	0.34
Calf	0.25
Adult sheep and adult goat	0.13
Young sheep and Young goat	0.06
Adult donkey	0.70
Young donkey	0.35
Adult mule	1.10
Mature chicken	0.013

Source: Strock *et. al.* (1991).

Appendix Table 13. Sample cooperatives in the study area

Cooperative	Year of establishment	Current capital	Man power	Receiving capacity (liter per day)			Regular suppliers
				Max	Min	Current	
Addis Alem Milk Cooperative	2004	350,111	4	1000	160	160	96
Abay Zuria Milk Cooperative	2005	600,000	5	4000	2000	614	174
Bahir Dar Milk Development Cooperative	2004	1,500,000	24	4000	2000	2400	56

Source: Own survey result, 2016.

Appendix Table 14. Milk cooperatives registered up to 2014 in ANRS

S.No	Zone	Number of Cooperatives	Number of Incorporated Kebeles	Number of Member Households		
				Male	Female	Total
1	North Gondar	7	7	273	82	355
2	South Gondar	8	12	223	30	253
3	Gondar Town	4	16	436	78	514
4	Awi	4	14	135	52	187
5	West Gojam	14	0	531	83	614
6	Dessie town	3	3	207	97	304
7	North Wollo	4	5	107	29	136
8	North Shewa	24	23	1614	704	2318
9	South Wollo	27	33	2854	201	3055
10	Bahir Dar City	2	0	90	16	106
11	East Gojam	24	36	1169	178	1347
12	Oromia	3	3	110	36	146
	Total	124	152	7749	1586	9335

Source: ANRS Cooperative Promotion Agency, 2016.

Appendix Table 15. Milk cooperative unions registered up to 2014 in ANRS

S.No	Name of the Union	Zone	District	Town	Number of Member Cooperatives	Number of Kebeles	Number of Member Households		
							Male	Female	Total
1	Jan Tekel	North Gondar	Gondar Town	Gondar Town	10	7	560	103	663
2	Hiwot Shewa	North Gondar	Debre Berhan	Debre Berhan	5	14	304	112	416
3	Gojam Dejen	Dejen	Yetnora		10	11	338	45	383
				Total	25	32	1202	260	1462

Source: ANRS Cooperative Promotion Agency, 2016.

Appendix Table 16. Summary of interview questionnaires and checklists

I. QUESTIONNAIRE FOR DAIRY PRODUCERS

Hello! My name is _____ and I work in _____. This is a study on ***Institutional Analysis of Dairy Marketing in Bahir Dar milk shed area***. We have randomly selected dairy producer households who have dairy cows in order to make some important issues on institutions and dairy marketing and you are one of them. The information you gave us will be used only for the purpose of this research and will not be used by anyone else. I hope you will co-operate us kindly and answer the questions correctly. Thank you very much!

Name of Enumerator _____ **Date** _____

Region: Amhara **Zone:** _____ **District:** _____ **Kebele:** _____

Section A: General Information

1. Name of respondent _____
2. Sex of the household head 1= male 2= female
3. Age of the household head _____
4. Marital status 1= unmarried 2= married 3= divorced 4= widowed
5. Religion of the household 1= Orthodox 2= Muslim 3= Protestant
4= Catholic 5= No religion 6= others (specify) _____
6. Years spent in education of household head _____
7. Family members' information

S. No	Name	Sex 0=F 1=M	Age	Relation to the household head (code)	Years spent in Education	Participation in Dairy Activities		
						Fully participate	Partially participate	Not participate

Code: 1=Husband 2=Wife 3=Child 4= Father/Mother 5=Sister/Brother

6= Grand Child 7= Hired labor 8= Other relatives

9= Others (specify) _____.

8. Number of years lived in this milk shed area _____.
9. Number of years involved in agriculture (other than dairy) _____.
10. Number of years engaged in dairy farming _____.

11. Source of labor supply for your dairy farming.

1=family members 2= hired labor 3=both

Section B: Income sources

1. What is your primary source of income? 1= dairy keeping 2= crop production

3= other livestock keeping 4= business (trading) 5= government employment

6= wage employment 7= remittance 8= others (specify) _____.

2. Do you have other non/off farm income? 0=No (**Skip to Q-5**) 1=Yes

3. If yes, what is the source of income? 1= trading 2=wage employment

3=government employment 4=remittance 5=others (specify) _____.

4. Income generating activities in the last 12 months

Description	Participation of family members in the last 12 months 0=No 1=yes	Total number of family members participated	Average monthly income (Birr)	Total yearly income (Birr)
1=Trading of food crops				
2=Selling of fuel wood				
3=Selling of construction wood				
4=Selling of wood charcoal				
5=Selling of feed				
6=Trading of livestock and its products				
7=Food/Cash for work				
8=Wage				
9=Government employment				
10=Metal or wood work				
11=Traditional weaving products (<i>Shimena</i>)				
12=Others _____				

5. Do you record every detail of your expenses and incomes?

0=No 1=Yes (**Skip to Sec. C Q-1**)

6. If no, what is the reason? 1=no knowledge of record keeping 2=no need to

record keeping 3= carelessness 4=others (specify) _____

Section C: Livestock ownership

1. Livestock ownership and estimated values in the survey year

Livestock type		Number	Est. Av. Price (in Birr)	Total Price (in Birr)	Sold in the last 12 months (in Birr)	Remark
Ox						
Bull						
Cow	Cross					
	Local					
Heifer	Cross					
	Local					
Weaned calf	Cross					
	Local					
Calf	Cross					
	Local					
Adult sheep						
Young sheep						
Mature goat						
Young goat						
Donkey (adult)						
Donkey (young)						
Horse (adult)						
Horse (young)						
Mule (adult)						
Mule (young)						
Mature chicken						
Honey bee colony	Modern					
	Transitional					
	Traditional					

2. Selling of livestock products in the last 12 months

Product description	Unit	Average Quantity per week	Average unit price of the year (in Birr)	Buyer (<i>Code</i>)	Total price	Remark
1=Milk						
2=Butter						
3=Cheese						
4=Yoghurt						
5=Eggs						
6=Meat						
7=Honey						
8=Skin						
9=Hides						
10=Manure						
11=Fish						
12=Others (specify) ____						

Code: 1=consumer 2= dairy cooperatives/milk processors 3=markets (such as traders, commission men and /or brokers, hotels, restaurants, cafeterias, and other institutions such as educational and health institutions). ***PLEASE UNDERLINE THE BUYER IF AMONG THE "MARKETS"***

Section D: Dairy production and Marketing

1. Total land the household has currently (hectare) _____. His own land____, Shared in _____, shared out _____, rented in_____, rented out_____. Grazing land _____.
2. Type of feeding system the household practices 1= free grazing 2= semi grazing 3= zero grazing 4= others (specify) _____.
3. Is there communal grazing land in your locality? 0=No 1=Yes
4. How many milking cows do you have currently? _____
5. Volume of milk produced per day (in liters):

Time	No of cows in milk	Volume of milk produced per time (in liters)			Average milk produced per cow (liters per day)	Total milk produced (liter/day)	Remark
		Minimum	Maximum	Average			
Morning							
Evening							

6. Average lactation period of cows (in months)
1= local cows_____ 2= cross breed cows_____
7. Do you sell milk? 0= No (**Skip to Q-9**) 1= Yes
8. To whom do you sell your milk? 0=I do not sell milk 1=consumer 2=dairy cooperatives/milk processors 3=markets (such as traders, commission men and /or brokers, hotels, restaurants, cafeterias, and other institutions such as educational and health institutions)
9. If you do not sell, what is the reason? 1=low production of milk 2=low price of milk 3=no demand (market) for milk 4= others (specify) _____

10. If you sell milk, use of milk and milk products of the total milk produced (%)

Period	Sold as raw milk (%)	Consumed as raw milk (%)	Processed for different products (%)	Buyer of raw milk (Code A)	Average price of milk (Birr per liter)	Types of processed products (Code B)					
						Prod 1	% of milk	Prod 2	% of milk	Prod 3	% of milk
Non-Fasting											
Fasting											

Code A: 1=consumer 2= dairy cooperatives/milk processors 3=markets (such as traders, commission men and /or brokers, hotels, restaurants, cafeterias, and other institutions such as educational and health institutions). **PLEASE UNDERLINE THE BUYER IF AMONG THE " MARKETS"**

Code B: 1=Butter 2=Cheese 3=yoghurt 4=Others (specify) _____

11. Do you get market information concerning milk price/demand?

0=No (**Skip to Q-13**) 1=Yes

12. If yes, what is your source of market information?

1=other farmers 2= livestock extension agent 3= trader 4= cooperatives 5= milk processors 6= Mass media (Radio/TV/News-papers) 7= others (specify) _____.

13. Who sets the price of milk?

1= producer 2= buyer 3= negotiation 4=(others specify) _____

14. How do you find your buyer? 1= we found each other physically 2= we found each other by telephone 3= we were arranged by government 4=arranged by NGO 5=by brokers 6=others (specify)_____

15. What is the criterion to prefer your buyer? 1= good price 2= immediate payment 3= providing credit 4= payment on agreed time 5=volume of sale 6=trust 7=relative 8=providing containers/utensils 9=provides market information 10= provides training 11=I do not have awareness of any other buyers 12=others (specify) _____

16. Do you take the milk to your buyer or does your buyer come to you?

1= I go to the buyer 2= the buyer come to me 3=others (specify) _____

17. Have you ever been faced with spoilage of milk? 1=Yes 0=No (**Skip to Q-20**)

18. If yes, could you estimate the volume and estimate price of the milk spoiled during the last 12 months. In liter _____, in Birr _____.
19. What was the reason for the spoilage of milk? 1= due to poor hygiene 2= due to delayed delivery to the selling (collecting) center 3= due to breaching of contracts with the buyer 4=others (specify) _____
20. What do you do with unsold milk? 1=consumed at home 2= processed for cheese 3=processed for yoghurt 4= processed for butter 5=others (specify) _____
21. How do you sell your milk? 0= individually 1= in group
22. Did your buyer complaint about the quality of your milk?
0=No **(Skip to Q-24)** 1=Yes
23. If yes, what was the problem? 1= adulterated with water 2=stayed for long time 3=low fat content 4= poor containers 5=contaminated 6=others (specify) _____.
24. Is there milk demand fluctuation within one year? 0=No **(Skip to Q-29)** 1=Yes
25. If yes what is the month with the lowest demand for milk? _____
26. What is the price of milk in the month with the lowest demand? _____
27. What is the month with the highest demand for milk? _____
28. What is the price of milk in the month with the highest demand? _____
29. What is the method of payment for your milk sale?
1= immediate cash payment 2= weekly payment 3= monthly payment
4=others (specify) _____
30. Is there delayed payment from your buyers? 0=No 1=Yes
31. Do you have trust on your milk buyer? 0=No 1=Yes **(Skip to Q-33)**
32. If no, what is the distrust the buyer has? 1= cheating of price 2=cheating on measuring scales 3=delayed payment 4=others (specify) _____.
33. Do you have contractual agreement with your milk buyers?
0=No **(Skip to Q-35)** 1=Yes

34. If yes, type, nature, and terms of agreement:

Milk Buyer		Type of contract (A)	Nature of agreement (B)	Terms of agreement (C)
1=Consumers				
2=cooperatives/ processors	Cooperatives			
	processors			
3=Market	Traders			
	Commission men/brokers			
	Hotels/restaurants/cafes			
	Education institutions			
	Health institutions			
	Others _____			

Code:

A=Type of contract	B=Nature of contract	C=Terms of agreement
1= Short term (One month)	1=Formal (written) agreement	1=Specified milk price
2=Medium term (one lactation period)	2=Informal agreement (based on mutual understanding)	2=Specified volume of milk
3= Greater than one lactation period	3=Others(specify)_____	3=Quality of milk
4=Others_____		4=Others(specify)_____

35. Do you get any support concerning dairy production or dairy marketing?

0=No (**Skip to Q-38**)

1=Yes

36. If yes, what support do you obtain? 1=credit 2=market information 3=market linkage 4=collective marketing 5=dairy training 6=marketing training 7=input supply 8=others (specify) _____.

37. Who gave you the support? 1=Government 2=NGO 3=Buyer 4=other (specify) _____.

38. From whom do you get input supply such as feed/Breed etc.?

1=from cooperatives 2=from traders 3= from processors 4=from market 5=others (specify) _____

39. How do you trust your suppliers? 1=no trust 2=low 3=moderate 4= high

Section E: Household Participation

1. Do you participate in leadership of formal /or informal social organizations in your kebele? 0=No (**Skip to Sec. F, Q-1**) 1= Yes

2. If yes, in which? 1= Kebele 2= religion 3= political leader 4= *Idir* 5= *Mahiber*
6= *Equb* 7= others (specify)_____

Section F: Membership to milk Cooperative or other group

1. Are you a member of milk cooperative? 0=No (**Skip to Q-4**) 1=Yes
2. If you are a member of that cooperative, what service and/or benefits do you get from the cooperative? 1= provision of training, extension, breeding, or veterinary services
2= input supply 3=market linkage 4=provision of credit/loan 5= others
(specify)_____
3. How long have you been a member (years)? _____.
4. Are you a member of the any other collective action group or association other than milk cooperative? 0=No (**Skip to Sec. G, Q-1**) 1=Yes
5. If yes, what is the name of that collective action group? _____
6. What benefits do you get from this group association? 1=No benefit 2= market information 3=marketing training 4=marketing linkage 5=credit 6= dairy inputs 7=dairy training 8=collective marketing 9=others (specify) _____

Section G: Institutional Aspects

1. Is there any regulation /law or bylaw governing dairying in your locality?
0=No (**Skip to Q-8**) 1=Yes
2. If yes, what are the regulations? 1= regulations regarding milk quality 2= selling to specified agency (buyer) 3=restriction of free grazing 4=others (specify) _____
3. Who is responsible for making sure that laws and regulations are enforced?
1= the government 2= the local community 3= the dairy cooperative 4=others
(specify) _____.
4. Is there any penalty in case of breaking the above laws? 0=No (**Skip to Q-7**) 1=Yes
5. If yes, what is the penalty? 1=penalty in Birr 2= prison 3=prohibiting from the service 4=others (specify)_____.
6. Are the laws enforced as required? 0=No 1=Yes
7. What regulations /law or bylaw is affecting your dairy business? _____
8. Do you have knowledge on the availability of legal enforcement mechanism in case of breaking contractual agreement? 0=No 1= Yes
9. Have you ever been faced with any breach of contractual agreement with your buyer?
0=No (**Skip to Q 14**) 1=Yes

10. If yes, is there any legal enforcement to correct these breaches? 0= No 1=Yes
11. Who is responsible to make sure that laws and responsibilities are enforced? 1=the government 2= the contracted parties 3= cooperatives or processors 4=others (specify)___
12. How do you resolve the breaching problem?
1=by negotiation 2=by going to court 3= others (specify) _____
13. Are you satisfied with the legal enforcement mechanisms taken to correct the breach?
0=No 1=Yes
14. Do you have access to credit? 0= No (**Skip to Q-20**) 1=Yes
15. If yes, do you have taken credit/loan in the last 12 months?
0=No (**Skip to Q-20**) 1=Yes
16. If yes, source of credit/loan 1= milk buyer 2= friends 3= relatives
4= microfinance (ACSI) 5=other banks 6= “Arata” 7= others (specify)
17. What is the advantage of obtaining credit from this source? 1= low interest rate
2= long repayment period 3=provision of enough credit 4=no bureaucracy
5=no other alternatives 6=others (specify) _____
18. How do you get credit? 1=by collateral 2=by group formation 3=no need of any preconditions 4=others (specify) _____
19. If collateral, what is that? 1=house 2=land 3=livestock 4=others (specify) _____
20. Do you obtain credit from your milk buyers? 0=No 1=Yes
21. Distance to nearest infrastructure and marketing facilities

All weather road			Milk cooperative			Milk processor			Nearest milk market (other than cooperative)			Input supplier		
Walking (minutes)	Driving (minutes)	k m	Walking (minutes)	Driving (minutes)	k m	Walking (minutes)	Driving (minutes)	k m	Walking (minutes)	Driving (minutes)	k m	Walking (minutes)	Driving (minutes)	k m

22. What is the condition of road to the nearest market? 0=Poor 1=Good
23. Do you have contact with extension agent? 0=No (**Skip to Q-26**) 1=Yes
24. Have you contacted livestock extension agent? 0=No (**Skip to Q-26**) 1=Yes
25. If yes, frequency of contact with livestock extension agent: 1= daily 2=weekly
3= every two weeks 4=others (specify) _____

26. Do you have social network or contact in your locality?

0=No (**Skip to Q-29**)

1=Yes

27. If yes, how many local and distant contacts do you have respectively? _____ & _____.

28. If yes, what is the nature of contact? 1=poor 2= medium 3=good 4= strong

29. Do you have knowledge on grades and standards of milk? 0=No 1=Yes

30. What challenges do you face during dairy production (Multiple answer is possible)?

1= shortage of dairy production training 2= shortage of dairy product handling

training 3=shortage of feed 4=shortage of improved breeds 5=others

(specify)_____

31. What challenges do you face during marketing (Multiple answer is possible)?

1=price uncertainty 2=un trusted customer 3=product deterioration

4=unreliable buyer 5= demand fluctuation 6= high competition 7=shortage of marketing linkages 8=absence of cooperatives and/or processors 9=others

(specify)_____.

32. Is there any institutional problem (impediment) regarding dairy marketing?

0=No (**Skip to Q-34**)

1=Yes

33. If your answer is yes, what are they?

Description	Do you consider them as impediments /problems during marketing 1=Yes 2=No	Remark
1=Absence or shortage of legal protection in case of cheating on prices		
2=Absence or shortage of legal protection from cheating on weighting scales		
3=Poor government policy		
4=Cultural influences		
5=Input supply problem		
6=Infrastructural (road, telecom, electricity, etc.)		
7= Incomplete property rights on land		
8=Domination of marketing by few organizations		
9=Others (specify) _____.		

34. If you are member of dairy cooperatives, please respond to the following Trust indicators

Description	Scale			
	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
The cooperative is established to benefit the dairy producers				
There is good relationship between producers and the cooperative				
The cooperative treats producers with care				
The cooperative treats all producers equally				
The cooperative pays good price to dairy producers				
The cooperative decisions are to benefit both the cooperative and the dairy producers				
The cooperative provides services to producers as expected				
The cooperative stands for the right of its producer members				
The cooperative creates market linkages				

35. Trust the household has on processors

Description	scale			
	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
The processor is established for mutual benefit				
There is good relationship between producers (suppliers) and the processors				
The processor treats producers with care				
The processor treats all producers equally				
The processor pays good price to dairy producers				
The processors decisions benefit both the processors and the dairy producers				
The processor provides services to producers as expected				
The processor stands for the right of its suppliers				

36. Trust the household has on traders

Description	scale			
	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
There is good relationship between producers (suppliers) and the traders				
The traders treat producers with care				
The traders treats all producers equally				
The traders pay good price to dairy producers				
The traders' decisions benefit both the traders' and the dairy producers				
The traders provide services to producers as expected				
The trader stands for the right of its suppliers				

37. Trust the household has on Government

Description	scale			
	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
There is good relationship between producers and the government				
The government treats all producers equally				
The government decisions are to benefit the dairy producers				
The government provides services to producers as expected				
The government creates market linkages				
The government laws are to benefit the dairy producers				
The legal system are trusted by the producers				

38. Transaction and transport costs for the last 12 months

Description	Milk		Butter	
	Time (minutes)	Cost (Birr)	Time (minutes)	Cost (Birr)
Searching for trading partner (buyer)				
Searching for price information				
Screening for potential partner				
Negotiation (bargaining) to reach agreement				
Enforcement of law(settling case) for breaching contract				
Transport cost (during transporting the product)				
Others (specify) _____				

39. How do you evaluate your relationship with dairy marketing actors regarding dairy marketing? (use $\sqrt{\text{mark}}$)

Dairy marketing actors	Relationship status with the dairy actors					Remark
	No relation at all	Very weak	Weak	Strong	Very strong	
Dairy producers						
Village collectors						
Traders						
Commission men/brokers						
cooperatives						
Processors						
Consumers						
Health institutions						
Education institutions						
Restaurants/hotels/cafe						
Input suppliers						
Government						

40. Any additional suggestions you would like to say:

If you have, please your phone No _____

“Thank you for your cooperation”

II. QUESTIONNAIRE FOR TRADERS

Name of Enumerator _____ Date of interview _____

Region: Amhara Zone: _____ District: _____ Kebele: _____

Type of Business: 1= Wholesaler 2=Retailor 3= Village trader

Type of product you trade: 1=Milk 2=Butter 3=Both

Section A: General information

1. Name of respondent _____

2. Sex of the household head 1= male 2= female

3. Age of the household head _____

4. Marital status 1= unmarried 2= married 3= divorced 4= widowed

5. Religion of the household 1= Orthodox 2= Muslim 3= Protestant 4= Catholic 5= No religion 6= others (specify) _____

6. Years spent in education _____

Code:

A: Source	B: Type of milk	C: Frequency of purchase	D: Criteria	E: Mode of Payment	F: Business arrangement
1=Producer 2=Village collector 3=Cooperative 4=Processor 5=Small trader 6=Commission men/broker 7=Others_____	1=Raw fresh milk 2=Boiled fresh milk 3=Packed fermented 4=Yoghurt 5=Others_____	1=once per day 2=twice per day 3=once per two days 4= every week 5=others_____	1=Volume 2=Quality 3=others_____	1=Cash 2=payment per week 3=Payment per month 4=Others_____	1=written contract 2=verbal agreement 3=spot market 4=others_____

12. Do you record every detail of your expenses and incomes?

1=Yes (**Skip to Q-14**) 2=No

13. If no, what is the reason? 1=no knowledge of record keeping 2=no need to record keeping 3= others (specify _____)

14. Do you have contractual agreement with your suppliers? 1=Yes 2=No (**Skip to Q-16**)

15. If yes, type, nature, and terms of agreement:

Suppliers	Type of contract (A)	Nature of agreement (B)	Terms of agreement (C)
1=Producer			
2=Village collector			
3=Cooperative			
4=Processors			
5=Small traders			
6=Commission men/broker			
7=Others			

Code:

A=Type of contract	B=Nature of contract	C=Terms of agreement
1= Short term (one month)	1=Formal (written) agreement	1=Specified price
2= Medium term (1-6 months)	2=Informal agreement (based on mutual understanding)	2=Specified volume
3= Greater than 6 months	3=Others _____	3=Quality
4=Others_____		4=others _____

16. Do you get adequate supply of milk/butter? 1=Yes (**Skip to Q-18**) 2=No

17. If no, what is the reason? 1= shortage of supply 2= shortage of quality
3=high price 4=others (specify _____).

18. Do you provide any service/support to your supplies? 1=Yes 2=No (**Skip to Q-20**)

19. If yes, what services do you provide? 1=training 2=credit
3=consultation 4=materials/utensil 5= transportation 6=others
(specify)_____.
20. Who sets the purchasing price? 1=myself 2= the seller 3=negotiation
4= others (specify)_____.
21. How do you trust your suppliers? 1=no trust 2=low 3=moderate 4= high
22. To whom do you sell your milk? 1=consumers 2= retailers
3=wholesalers 4=commission men/broker 5=health institutions
6= education institutions 7=others (specify) _____.
23. How many regular buyers do you have? _____.
24. Volume of products sold in the last 12 months

Type of product	Type of Buyer (A)	Share (%)	Unit	Quantity	Price (Birr/unit)	Frequency of sells (B)	Types of milk (C)	Mode of payment (D) Business arrangement (E)	Total revenue per month	Total revenue in the last 12 months
1=Milk										
2=Butter										
3=Yoghurt										
4=Cheese										
5=Others_____										
Code A:Buyers 1=Consumers 2=Retailers 3=Wholesalers 4=Commission men/brokers 5=Health institutions 6=Education institutions 7=Others _____		B: Frequency of purchase 1=once per day 2=twice per day 3=once per two days 4= every week 5=others (specify)		C: Type of milk 1=Raw fresh milk 2=Boiled fresh milk 3=Packed fermented 4=Yoghurt 5=Others (specify)_____		D: Mode of Payment 1=Cash 2=payment per week 3=Payment per month 4=Others (specify)- _____			E: Business arrangement 1=written contract 2=verbal agreement 3=spot market 4=others (specify)_____ -	

25. Do you have contractual agreement with buyers? 1=Yes 2=No **(Skip to Q-27)**
26. If yes, type, nature, and terms of agreement:

Milk Buyer	Type of contract (A)	Nature of agreement(B)	Terms of agreement (C)
1=Consumers			
2=Retailers			
3=Wholesalers			
4=Commission men/broker			
5=Health institution			
6=Education institution			
7=Others_____			

Code:

A=Type of contract	B=Nature of contract	C=Terms of agreement
1= short term (one month)	1=Formal (written) agreement	1=Specified price
2= medium term (1-6 months)	2=Informal agreement (based on mutual understanding)	2=Specified volume
3= greater than 6 months	3=Others (specify)_____	3=Quality
4=others_____		4=others_____

27. Who sets the selling price? 1=myself (the trader) 2= the buyer
 3=negotiation 4= others (specify) _____.
28. How do you trust your buyers? 1=no trust 2=low 3=moderate 4= high
29. Is there any price difference to different customers? 1=Yes 2=No **(Skip to Q-31)**
30. If yes, what are the bases for the price differences? 1= volumes 2= constant purchase 3= delivery distance 4=others (specify) _____.
31. When do you get the money from selling the product? 1= immediately after sale
 2= after a week 3=after a month 4=others (specify)_____.
32. Is there delayed payment from your buyers? 1=Yes 2=No
33. Do you have packaging material? 1=Yes 2=No**(Skip to Q-35)**
34. If yes, what is the packaging material? _____.
35. Do you have other branches for selling your dairy products?
 1=Yes 2=No **(Skip to Q-37)**
36. If Yes, where are they located? 1= with in the kebele 2= with in the district
 3= within the Zone 4=with in the region 5=outside the region_____
37. Transaction and transport costs for the last 12 months

Description	Milk		Butter	
	Time (minutes)	Cost (Birr)	Time (minutes)	Cost (Birr)
Searching for trading partner (sellers)				
Searching for trading partner (buyers)				
Searching for price information				
Screening for potential partner				
Negotiation (bargaining) to reach agreement				
Enforcement of law(settling case) for breaching contract				
Transport cost (during transporting the product)				
Others (specify) _____				

38. Any other marketing costs in the last 12 months?

Category	Cost per month (in Birr)	Annual cost	Remark
Loss due to spoilage			
Storage cost			
Electricity			
Material (utensil) cost			
Material(utensil) rent			
Taxes			
water			
License registration			
License fees (annual)			
Penalty			
Fuels			
Others costs(specify)			

39. Do you have your own means of transport 1=Yes 2=No (**Skip to Sec. C, Q-1**)

40. If yes, what is that? 1=bicycle 2=motorcycle 3=car 4=others (specify) ____.

Section C: Household Participation

1. Do you participate in leadership of formal /or informal social organizations in your kebele? 1= Yes 2=No (**Skip to Sec. D, Q-1**)

2. If yes, in which? 1= Kebele 2= religion 3= political leader 4= *Idir* 5= *Mahiber* 6= *Equb* 7= others (specify)_____

Section D: Membership to Association or other group

1. Is there any traders' association in your locality? 1= Yes 2= No (**Skip to Q-7**)

2. If yes, are you a member of that association? 1=Yes 2=No (**Skip to Q-7**)

3. If you are a member of that association, what service and/or benefits do you get from the association? 1=I don't get any service and/or benefits 2=provision of training on trading 3= market linkage 4=provision of credit/loan 5=others (specify)_____.

4. What is your contribution to that association? 1=no contribution 2= in decision making as a member 3= in decision making as a member of the committee 4=others (specify) _____.

5. How long have you been a member (years)? _____.

6. What is a membership entrance fee and annual fee (in Birr) respectively? ____&____.

7. How do you evaluate the network between traders? 1=weak 2=moderate 3=good

Section E: Institutional Aspects

1. Are you aware of any regulations/laws regarding dairy marketing? 1=Yes 2=No (**Skip to Q-4**)

2. If yes, what are these regulations/laws? 1= registration 2= paying fees /levies
3= giving services to sellers 4=keeping hygiene 5= others (specify) _____.
3. Who is responsible on enforcing these laws/regulations?
1= the government 2= the trader association 3=others (specify) _____.
4. Have you ever been faced with any breach of contractual agreement with your buyer or seller? 1=Yes 2=No (**Skip to Q-9**)
5. If yes, is there any legal enforcement to correct these breaches?
1=Yes 2= No (**Skip to Q-9**)
6. Who is responsible to make sure that laws and responsibilities are enforced? 1= the government 2= the contracted parties 3= cooperatives or processors 4=others (specify)
7. How do you usually resolve the breaching problem?
1=by negotiation 2=by going to court 3= others (specify) _____
8. Are you satisfied with the legal enforcement mechanisms taken to correct the breach?
1=Yes 2=No
9. Have you access to credit? 1=Yes 2=No (**Skip to Q-12**)
10. If yes, did you take credit in the last 12 months? 1=Yes 2=No (**skip to Q-12**)
11. If yes, who is the source for your credit?
1= milk buyer 2= friends 3= relatives 4= microfinance (ACSI)
5=other banks 6= “Arata” 7= others (specify)
12. How do you get credit? 1=I do not use credit (why)? _____ 2=by collateral
3=by group formation 4=no need of any preconditions 5=others (specify) _____
13. If collateral, what is that? 1=house 2=salary 3=others (specify) _____
14. Is there any regulation/law hindering your dairy trading business?
1=Yes 2=No (**Skip to Q-16**)
15. If yes, what are these regulations/laws? 1=high tax rate 2=immediate registration after starting business 3= strict quality control 4=unfair penalty 5=others (specify)_____.
16. Is there any institutional problem (impediment) regarding dairy marketing?
1=Yes 2=No (**Skip to Q-18**)
17. If yes, what are they? 1=absence or shortage of legal protection in case of cheating on prices 2=absence or shortage of legal protection from cheating on weighting scales 3= poor government policy 4=cultural influences 5=Input supply problem 6=Infrastructural (road, telecom, electricity, etc...) 7=Incomplete property rights on land 8=Domination of marketing by few organizations 9= others (specify) _____

18. Do you get any support concerning your dairy business? 1=Yes 2=No **(Skip to Q-21)**

19. If yes, source of the support: 1= Government 2=NGO (specify) _____

3=trader organization/union 4=others (specify) _____

20. What support do you obtain? 1=credit/loan 2=business training

3=supply of free working area/place for trading 4=purchasing of materials free of tax

5=others (specify) _____.

21. Are you satisfied with your dairy trading business? 1=Yes 2=No

22. How do you evaluate your relationship with dairy marketing actors regarding dairy marketing? (Use $\sqrt{\text{mark}}$)

Dairy marketing actors	Relationship status with the dairy actors					Remark
	No relation at all	Very weak	Weak	Strong	Very strong	
Dairy producers						
Village collectors						
Other traders						
Commission men/brokers						
cooperatives						
Processors						
Consumers						
Health institutions						
Education institutions						
Restaurants/hotels/cafe						
Input suppliers						
Government						
Others _____						

23. Is there any challenge facing your dairy business? 1=Yes 2=No **(Skip to Q-25)**

24. If yes, what are these challenges? (Rank)

1. _____

2. _____

3. _____

25. Any Opportunities concerning dairy marketing? 1=Yes 2=No.

26. If yes, rank and list

1. _____

2. _____

3. _____

If you have, please your phone No _____

“Thank you very much for your cooperation”

III. QUESTIONNAIRE FOR CONSUMERS

Name of Enumerator _____ Date of interview _____

Region: Amhara Zone: _____ District: _____ Kebele: _____

1. Name of respondent _____
2. Sex of respondent: 1=Male 2=Female
3. Age of respondent in years _____
4. Education status in years of schooling: _____
5. Marital status 1= unmarried 2= married 3= divorced 4= widowed
6. Religion of the household head 1= Orthodox 2= Muslim 3= Protestant
4= Catholic 5= No religion 6= others (specify) _____
7. Family size: Male _____ Female _____
8. Age category of family members: 1 years old and below_____, 1-2 years
old_____ 2-5years _____, 5-18years _____, above 18_____.
9. How many liters of milk do you and your family consume per day? _____.
10. What is the price (Birr/liter)? Maximum_____, Minimum _____, Average _____
11. What is the month with the highest price of milk? _____
12. What is the month with the lowest price of milk? _____
13. Who consumes the milk you bought?
1= only children 2= all family 3=others (specify) _____
14. Source and volume of milk and milk products you bought to use?

Type of product	Source (Code A)	Share (%)	Unit	Quantity Bought per month	Type of milk (Code B)	Price per unit (Birr)
1=Milk						
2=Butter						
3=Yoghurt						
4=Cheese						
5=Others_____						
Code A: 1=Producer 2=Village collector 3=Cooperative 4=Processor 5=Wholesaler/Retailer 6=Commission men/broker 7= Open market 8=Super market 9=Others(specify)_____				Code B: 1=Raw fresh milk 2=Boiled milk 3=Packed fermented 4=Yoghurt 5=Others(specify)_____		

15. How do you evaluate the relationship with your milk suppliers?
1=weak 2=moderate 3=good
16. How many regular milk suppliers do you have? _____.

17. What is your preference for choosing the seller? 1=quality of milk 2=reliable supply 3=trust (loyalty) 4=low price 5=nearness to my home 6=others (specify) _____
18. Where do you buy the milk? 1=from producer's home 2=the cooperatives 3=from the processors' shops 4=the seller brings the milk to my home 5=open market 6=super market 7= others (specify)_____
19. What type of milk do you and your family usually buy? 1=fresh raw milk 2=fresh boiled milk 3=skimmed (non-fat) milk 4=powdered milk 5=others (specify) _____
20. What type of milk and milk products do you and your family consume most of the time? 1=fresh raw milk 2=fresh boiled milk 3=skimmed (non-fat) milk 4=powdered milk 5=butter 6= cheese 7=Yoghurt 8=others (specify) _____
21. What is your preference for choosing the type of milk? 1=freshness 2=fat content 3=taste 4=cleanliness 5=for health issues 6=others (specify) _____.
22. Do you obtain the amount of milk you demand? 1=Yes (**Skip to Q-24**) 2=No
23. If no, what is the reason? 1=shortage of supply 2=expensive price 3=low quality 4=others (specify) _____.
24. Do you have contractual agreement with your milk suppliers?
1=Yes 2=No (**Skip to Q-26**)
25. If yes, type, nature, and terms of agreement:

Milk suppliers	Price (Birr/liter)	Type of contract(A)	Nature of agreement(B)	Terms of agreement(C)
1=Dairy producers				
2=Village collector				
3=Cooperative				
4=Processor				
5=Wholesaler/Retailer				
6= Commission men/broker				
7=Open market				
8=Super market				
9=Others_____				
Code: A = Type of contract		B = Nature of contract		C = Terms of agreement
1= Short term (one month)		1=Formal (written) agreement		1=Specified milk price
2= Medium term (1-6 months)		2=Informal agreement (based on mutual understanding)		2=Specified volume of milk
3= Greater than 6 months		3=Others _____		3=Quality of milk
4=Others_____				4=others _____

26. Who sets the milk price? 1=myself 2=the seller 3=negotiation
4= others (specify) _____.
27. What is the method of payment for your milk purchase? 1=immediate cash payment
2=weekly payment 3=monthly payment 4=others (specify)_____
28. Do you get market information concerning milk price or demand?
1=Yes, 2=No (**Skip to Q-30**)
29. If yes, what is your source of market information?
1=other consumers 2= producers 3= trader 4= cooperatives 5= milk processors
6= Mass media (Radio/TV/New papers) 7= others (specify) _____.
30. How did you find your supplier? 1= we found each other physically 2= we
found each other by telephone 3= we were arranged by government 4=arranged
by NGO 5=by brokers 6=others (specify) _____
31. What challenges do you face during purchasing? 1=No challenges are faced
2=shortage of supply 3=price uncertainty 4=un trusted sellers 5=poor quality
of milk 6= unreliable supplier 7= supply fluctuation 8=shortage of marketing
linkages 9=others (specify)_____.
32. Have you ever been faced with breaching of contracts? 1=Yes 2=No (**Skip to Q-40**)
33. If yes, what are the breaches? 1=breaking on supply of volume 2= breaking on
agreed price 3=breaching on agreed quality 4=others (specify) _____.
34. Who is responsible for breaching the contracted agreements?
1=producers 2= cooperatives 3=processors 4=traders 5=seller commission
men/broker 6=others (specify) _____.
35. Is there any action taken to correct the breaching of contracts?
1=Yes 2=No (**Skip to Q-38**)
36. If yes, what was the action taken? 1=penalty on the contract breaker using formal
rule 2=penalty on the contract breaker using informal rule (specify)
_____ 3= others (specify) _____.
37. Are the laws enforced as required? 1=Yes 2=No
38. Who is responsible to make sure that laws and responsibilities are enforced?
1= the government 2= the contracted parties 3= cooperatives or processors
4=others (specify) _____.
39. Are you satisfied with the legal enforcement mechanisms taken to correct the breach?
1=Yes 2=No

40. Is there any institutional problem (impediment) regarding dairy marketing?

1=Yes

2=No (**Skip to Q-42**)

41. If yes, what are they? 1=absence or shortage of legal protection in case of cheating on prices 2=absence or shortage of legal protection from cheating on weighting scales 3= poor government policy 4=cultural influences 5=Input supply problem 6=Infrastructural (road, telecom, electricity, etc...) 7= Incomplete property rights on land 8=Domination of marketing by few organizations 9= others (specify) _____

42. Do you consume other dairy products other than milk? 1=Yes 2=No (**Skip to Q-44**)

43 If yes, type and quantity of dairy products consumed by you and your family per month

Dairy product	Unit	Quantity	Price (Birr/unit)	Total expenditure per month
Butter				
Yoghurt				
Cheese				
Others_____				

44. How do you evaluate your relationship with dairy marketing actors regarding dairy marketing? (Use $\sqrt{\text{mark}}$)

Dairy marketing actors	Relationship status with the dairy actors					Remark
	No relation at all	Very weak	Weak	Strong	Very strong	
Dairy producers						
Village collectors						
Traders						
Commission men/brokers						
Cooperatives						
Processors						
Other consumers						
Health institutions						
Restaurants/hotels/cafe						
Government						
Others_____						

45. Please, could you tell me your monthly income (in Birr)? _____.

46. Any suggestions concerning milk supply or quality?

If you have, please your phone No _____

Thank you for your cooperation!!

IV. QUESTIONNAIRE FOR COOPERATIVES

Name of Enumerator _____ Date of interview _____

Region: Amhara Zone: _____ District: _____ Kebele: _____

Section A: General information

1. Name of respondent _____.
2. Position in the cooperative _____.
3. Milk Cooperative Name _____.
4. Location: _____.
5. Establishment year _____.
6. Initial capital (in Birr) _____.
7. Current capital _____.
8. Number of members: Male _____ Female _____.
9. Total workers the cooperative has: ____, 1=illiterate____ 2= from 1-4 grades____
3=from 5-8 grades ____ 4=from 9-12 grades____ 5= diploma ____ 6= degree____

Section B: Production and Marketing

1. What is the purchasing capacity (in liters per day)? Maximum____, Minimum____.
2. Average milk collected per day (in liters): From Members ____, from non-members:____
3. How many regular suppliers /sellers do you have? _____.
4. Sources and volume of milk purchased in the last 12 months

Source		Volume of milk (liters)	Type of milk (A)	Price/liter (Birr)	Frequency of purchase (B)	Mode of payment (C)	Contractual arrangement(D)	Total cost per month	Annual cost
Members	1=Producer								
Non- members	2=Wholesaler								
	3=Small trader								
	4=Village collector								
	5=Cooperatives								
	6=Commission men/broker								
	7=Others _____								

Code:

A: Type of milk	B: Frequency of purchase	C: Mode of Payment	D: Contractual arrangement
1=Raw fresh milk 2=Boiled fresh milk 3=Packed fermented 4=Yoghurt 5=Others _____	1=once per day 2=twice per day 3=once per two days 4= every week 5=others _____	1=Cash 2=payment per week 3=Payment per month 4=Others _____	1=written contract 2=verbal agreement 3=spot market 4=others _____

5. Do you have contractual agreement with suppliers of milk? 1=Yes 2=No (**Skip to Q-7**)

6. If yes, type, nature, and terms of agreement:

Milk Supplier	Type of contract (A)	Nature of contract (B)	Terms of agreement(C)
1=Producer			
2=Wholesaler			
3=Small trader			
4=Village collector			
5=Cooperatives			
6=Commission men/broker			
7=Others _____			

Code:

A=Type of contract	B=Nature of contract	C=Terms of agreement
1= Short term (Up to one month)	1=Formal (written) agreement	1=Specified milk price
2=Medium term (1-6 months)	2=Informal agreement (based on mutual understanding)	2=Specified volume of milk
3= Greater than 6 months	3=Others (specify)_____	3=Quality of milk
4=others_____		4=others _____

7. Who sets the purchasing price? 1=the cooperative 2=discussing only with its members
3=discussing with members and other suppliers 4= others (specify) _____

8. Is there any incentive or disincentives based on the quality of milk brought to the cooperative? 1=Yes 2=No (**Skip to Q-10**)

9. If yes, what are they? 1=good price for quality milk 2= low price for poor quality milk
3=good price for large volume of milk 4=low price for small volume of milk
5=others (specify) _____

10. Do you get adequate supply of milk? 1=Yes (**Skip to Q-12**) 2=No

11. If no, what is the reason? 1= shortage of milk supply 2= shortage of quality milk
3=high price of milk 4=others (specify) _____.

12. Do you provide any service/support to your supplies? 1=Yes 2=No (**Skip to Q-14**)

13. If yes, what services do you provide? 1=training 2=credit 3=consultation
4=materials/utensil 5= transportation 6=others (specify)_____.
14. How do you trust your suppliers? 1=no trust 2= high 3=moderate 4=low
15. To whom do you sell your product? 1=consumers 2= retailers
3=wholesalers 4=commission men/broker 5=health institutions
6=education institutions 7=processors 8=others (specify) _____.
16. When do you get the money? 1= immediately after sale 2= after a week
3=after a month 4=others (specify)_____.
17. Is there delayed payment from your buyers? 1=Yes 2=No
18. Where do you sell your milk? 1= at the cooperative 2=deliver to the buyers'
home 3=open market 4=others (specify) _____.
19. How many regular buyers do you have? _____.
20. Buyer and volume of milk sold in the last 12 months

Buyers	Volume of milk (liters)	Type of milk (A)	Price/liter (Birr)	Frequency of purchase (B)	Mode of payment (C)	Business arrangement (D)	Total income per month	Annual income
1=Consumers								
2=Retailers								
3=Wholesalers								
4=Commission men/broker								
5=Health institution								
6=Education institution								
7=Processors								
8=Others_____								

Code:

A: Type of milk 1=Raw fresh milk 2=Boiled fresh milk 3=Packed fermented 4=Yoghurt 5=Others (specify)____	B: Frequency of purchase 1=once per day 2=twice per day 3=once per two days 4= every week 5=others (specify)____	C: Mode of Payment 1=Cash 2=payment per week 3=Payment per month 4=Others (specify)____	D: Business arrangement 1=written contract 2=verbal agreement 3=spot market 4=others (specify)____
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21. Do you have contractual agreement with buyer of milk? 1=Yes 2=No(Skip to Q-23)

22. If yes, type, nature, and terms of agreement:

Milk Buyer	Type of contract(A)	Nature of agreement(B)	Terms of agreement(C)
1=Consumers			
2=Retailers			
3=Wholesalers			
4=Commission men/broker			
5=Health institution			
6=Education institution			
7=Processors			
8=Others			

Code:

A=Type of contract	B=Nature of contract	C=Terms of agreement
1= Short term (Up to one month)	1=Formal (written) agreement	1=Specified milk price
2= Medium term (1-6 months)	2=Informal agreement (based on mutual understanding)	2=Specified volume of milk
3= Greater than 6 months	3=Others (specify)_____	3=Quality of milk
4=Others_____		

23. Types of products and quantity sold in the last 12 months (other than milk)

Product	Unit	Quantity of product sold	Unit price (Birr)	Total price (Birr)	Main Buyer (Code)
1=Butter					
2=Yoghurt					
3=Cheese					
4=Others					

Code: 1=Consumers 2=Retailers 3=Wholesalers 4=Commission men/brokers 5=Health institution 6=Education institution 7=Processors 8=Others_____

24. How do you set the selling price? 1=based on the supply and demand 2= based on the volume of sale 3=based on the quality of products (grading) 4=based on the delivery distance 5=others (specify) _____.

25. How do you arrive to the final price with your buyers? 1=by negotiation 2=discussing with its members only 3= discussing with members and suppliers 4= based on operational and marketing costs 5=others (specify) _____.

26. What do you do with the unsold milk? 1=share back to the producers 2=get rid-off the milk 3=process to other products 4=others (specify) _____.

27. How much trust do you have in your buyers? 1=no trust 2=low 3=moderate 4=high

28. Do you get market demand for your milk? 1=Yes (Skip to Q-30) 2=No

29. If no, what is the reason? 1=low feeding habit for milk 2=low preference of the people to buy local milk products 3= religious influences 4= others (specify)_____
30. What marketing strategies do you use to sell your product? 1=No strategies used 2= promotion on medias 3= promotion using posters 4=promotion using brokers 5= personal contacts 6=others (specify) _____.
31. What problems do you face during collection and marketing of your products? 1=shortage of supply 2=lack of quality supply 3=shortage of demand 4=demand fluctuation 5=price fluctuation 6=high input cost 7=institutional/policy obstacles (specify) _____ 8=others (specify) _____
32. Means of transport the cooperative owns? 1=it doesn't own 2= bicycle 3=motor cycle 4=motor vehicle 5=others (specify) _____
33. Transaction and transport costs for the last 12 months

Description	Milk		Butter	
	Time (minutes)	Cost (Birr)	Time (minutes)	Cost (Birr)
Searching for trading partner (sellers)				
Searching for trading partner (buyers)				
Searching for price information				
Screening for potential partner				
Negotiation (bargaining) to reach agreement				
Enforcement of law(settling case) for breaching contract				
Transport cost (during transporting the product)				
Others (specify) _____				

34. Any other marketing costs in the last 12 months?

Category	Cost per month (in Birr)	Annual cost	Remark
Loss due to spoilage			
Storage cost			
Electricity			
Material (utensil) cost			
Material(utensil) rent			
Taxes			
Water			
License registration			
License fees (annual)			
Penalty			
Fuels			
Others costs(specify)			

35. Is there any cooperative organization/union in your locality?

1=Yes 2=No (**Skip to Q-41**)

36. If yes, what is the name of that union? _____.

37. Are you a member of that union? 1=Yes 2=No (**Skip to Q 41**)

38. What is the entrance fee (in Birr)? _____.

39. If you are a member, do you get any support from the union?

1=Yes 2=No (**Skip to Q-41**)

40. If yes, what kind of support do you get from the organization? 1= provision of
training on processing 2= market linkage 3=provision of credit/loan
5=others (specify) _____

41. Does the cooperative have linkages with other organizations?

1=Yes 2=No (**Skip to Sec. C, Q-1**)

42. If yes, with whom? 1=NGO 2=Private sector 3=Research institute
4=others (specify) _____

43. What support do you obtain? 1=credit/loan 2=technical training 3=supply of
free working area/ for collection/marketing /distribution 4=purchasing of materials
free of tax 5=others (specify) _____.

Section C: Institutional Aspects

1. Are you aware of any law/regulation concerning milk collection/distribution?

1=Yes 2=No (**Skip to Q-4**)

2. If yes, what are the laws/regulations? 1= registration before starting the business
2= ensure cleanliness/sanitation 3= insurance for your workers 4= construction
of building and waste treatment plants 5=others (specify) _____.

3. Who is responsible on enforcing the above laws? 1= the government
2= the cooperative association/union 3=others (specify) _____.

4. Is there any regulations/laws hindering your business? 1=Yes 2=No (**Skip to Q-6**)

5. If yes, what are these regulations/laws? 1=high tax rate 2=immediate registration
after starting business 3= strict quality control 4=unbalanced penalty
5=others (specify) _____.

6. Any breaching of contracts between you and your supplies or buyers?

1=Yes 2=No (**Skip to Q-11**)

7. If yes, what are the breaches? 1=breaking on supply of volume 2= breaking on
agreed price 3=breaking on agreed quality 4=breaking on time of delivery
5=others (specify) _____.

8. Who is responsible for breaching the contracted agreements? 1=producers
 2= supplier wholesalers 3=supplier small traders 4=village collectors
 5=the cooperatives 6=seller commission men/broker 7=consumers 8= retailers
 9=buyer wholesalers 10=buyer commission men/broker 11=health institutions
 12= education institutions 13= milk processor 14=others (specify) _____.

9. Is there any action taken to correct the breaching of contracts?

1=Yes 2=No (**Skip to Q-11**)

10. If yes, what was the action taken? 1=penalty on the contract breaker using formal rule
 2=penalty on the contract breaker using informal rule (specify) _____
 3= others (specify) _____.

11. How do you evaluate your relationship with dairy marketing actors regarding dairy marketing? (**Use $\sqrt{}$ mark**)

Dairy marketing actors	Relationship status with the dairy actors					Remark
	No relation at all	Very weak	Weak	Strong	Very strong	
Dairy producers						
Village collectors						
Traders						
Commission men/brokers						
cooperatives						
Processors						
Consumers						
Health institutions						
Education institutions						
Restaurants/hotels/cafe						
Input suppliers						
Government						
Others_____						

12. Is there any institutional problem (impediment) regarding dairy marketing?

1=Yes 2=No (**Skip to Q-14**)

13. If yes, what are they? 1=absence or shortage of legal protection in case of cheating on prices
 2=absence or shortage of legal protection from cheating on weighting scales
 3= poor government policy 4=cultural influences 5=Input supply problem
 6=Infrastructural (road, telecom, electricity, etc...) 7= Incomplete property rights on land
 8=Domination of marketing by few organizations 9= others (specify) _____

14. Do you gather feedback on your product from your buyers? 1=Yes 2=No **(Skip to Q-16)**

15. If yes, what are the feedbacks? 1=satisfaction on the quality 2= satisfaction on the supply 3=still improvement is needed on quality 4= still improvement is needed to increase the supply 5=others (specify) _____.

16. Are you satisfied with your business? 1=Yes 2=No

17. Is there any governance, infrastructure, or socioeconomic challenges facing your dairy business? 1=Yes 2=No **(Skip to Q-19)**

18. If yes, what are these challenges? (Rank)

1. Governance/policy_____

2. Infrastructure_____

3. Socioeconomic _____

19. Any Opportunities concerning dairy marketing? 1=Yes 2=No.

20. If yes, list and rank

1. _____

2. _____

3. _____

Thank you for your cooperation!!

V. QUESTIONNAIRE FOR PROCESSOR

Name of Enumerator_____ Date of interview_____

Region: Amhara Zone: _____ District: _____ Kebele: _____

Section A: General information

1. Name of respondent_____.

2. Milk Processor Name _____.

3. Location: _____.

4. Starting year _____.

5. Are you a registered processor 1=Yes 2=No

6. Initial capital (in Birr) _____.

7. Current capital _____.

8. Total workers the processor has: ____ 1=illiterate____ 2= from1-4 grades____ 3=from5-8 grades____ 4=from 9-12 grades____ 5= diploma____ 6= degree____

Section B: Production and Marketing

1. What is the processing capacity (in liters per day)? Maximum_____,
Minimum_____.
2. What products do you process? 1=Butter 2=Cheese 3=Yoghurt
4=Others(specify)_____
3. How many regular suppliers /sellers do you have? _____.
4. Sources and volume of milk purchased in the last 12 months

Source	Volume of milk (liters)	Type of milk (A)	Price/liter (Birr)	Frequency of purchase (B)	Mode of payment (C)	Business arrangement (D)	Total cost per month	Annual cost
1=Producer								
2=Wholesaler								
3=Small trader								
4=Village collector								
5=Cooperatives								
6=Commission men/broker								
7=Others _____								
Code:A: Type of milk 1=Raw fresh milk 2=Boiled fresh milk 3=Packed fermented 4=Others (specify)		B: Frequency of purchase 1=once per day 2=twice per day 3=once per two days 4= every week 5=others (specify)		C: Mode of Payment 1=Cash 2=payment per week 3=Payment per month 4=Others (specify)		D: Business arrangement 1=written contract 2=verbal agreement 3=spot market 4=others (specify)		

5. Do you have contractual agreement with suppliers of milk? 1=Yes 2=No **(Skip to Q-7)**
6. If yes, type, nature, and terms of agreement:

Milk sellers	Type of contract (A)	Nature of agreement (B)	Terms of agreement (C)
1=Producer			
2=Wholesaler			
3=Small trader			
4=Village collector			
5=Cooperatives			
6=Commission men/broker			
7=Others _____			

Code:

A=Type of contract	B=Nature of contract	C=Terms of agreement
1= Short term (one month)	1=Formal (written) agreement	1=Specified milk price
2= Medium term (1-6 months)	2=Informal agreement (based on mutual understanding)	2=Specified volume of milk
3= Greater than 6 months	3=Others _____	3=Quality of milk
4=Others_____		4=others _____

7. Do you get adequate supply of milk? 1=Yes (**Skip to Q-9**) 2=No
8. If no, what is the reason? 1= shortage of milk supply 2= shortage of quality milk
 3=high price of milk 4=others (specify) _____.
9. Do you provide any service/support to your supplies? 1=Yes 2=No (**Skip to Q-11**)
10. If yes, what services do you provide? 1=training 2=credit 3=consultation
 4=materials/utensil 5= transportation 6=others (specify)_____.
11. How do you trust your suppliers? 1=no trust 2=low 3=moderate 4= high
12. Who sets the purchasing price of milk? 1=the processor 2= the seller
 3=negotiation 4= others (specify) _____.
13. How many regular buyers do you have? _____.
14. Buyer and volume of product sold in the last 12 months

Type of product (A)	Type of Buyers	Volume of product (kg)	Price/kg (Birr)	Frequency of purchase (B)	Mode of payment (C)	Business arrangement (D)	Total income per month	Annual income
	1=Consumers							
	2=Retailers							
	3=Wholesalers							
	4=Commission me/broker							
	5=Health institution							
	6=Education institution							
	7= Hotels							
	8=Others_____							
	1=Consumers							
	2=Retailers							
	3=Wholesalers							
	4=Commission me/broker							
	5=Health institution							
	6=Education institution							
	7=Hotels							
	8=Others_____							

Code:

A: Type of Product	B: Frequency of purchase	C: Mode of Payment	D: Business arrangement
1=Butter 2=Cheese 3=Yoghurt 4=Others (specify) _____	1=once per day 2=twice per day 3=once per two days 4= every week 5=others (specify) _____	1=Cash 2=payment per week 3=Payment per month 4=Others (specify) _____	1=written contract 2=verbal agreement 3=spot market 4=others (specify) _____

15. Do you have contractual agreement with buyer of your products?

1=Yes

2=No (**Skip to Q-17**)

16. If yes, type, nature, and terms of agreement:

Type of Buyer	Type of contract(A)	Nature of agreement(B)	Terms of agreement(C)
1=Consumers			
2=Retailers			
3=Wholesalers			
4=Commission me/broker			
5=Health institution			
6=Education institution			
7= Hotels			
8=Others _____			

Code:

A=Type of contract	B=Nature of contract	C=Terms of agreement
1= short term (one month)	1=Formal (written) agreement	1=Specified price
2= short term (one lactation period)	2=Informal agreement (based on mutual understanding)	2=Specified volume
3= greater than one lactation period	3=Others (specify) _____	3=Quality of product
4=others _____		

17. How do you set the selling price? 1=based on the supply and demand 2= based on the volume of sale 3=based on the quality of products (grading) 4=based on the delivery distance 5=others (specify) _____.

18. What do you do with the unsold product? 1=sell it by reducing the price 2=get rid-off the product 3=others (specify) _____.

19. How do you trust your buyers? 1=no trust 2= high 3=moderate 4=low

20. Do you get good market demand for your product? 1=Yes (**Skip to Q-22**) 2=No

21. If no, what is the reason? 1=low feeding habit 2=low preference of the people to buy local milk products 3= religious influences 4= others (specify)_____

22. What marketing strategies do you use to sell your product? 1=no strategies used
2= promotion on medias 3= promotion using posters 4=promotion using
brokers and personal contacts 5=others (specify) _____.
23. What standards do you have? 1=quality grades 2=weights and measures
3=packaging 4=labeling 5=others(specify) _____.
24. Where do you sell your product? 1=at the processing plant 2= selling shop outside
the processing plant 3=export 4=market 5=outside the Region 6=others
(specify)_____.
25. What problems do you face during production/processing and marketing of your
products? 1=shortage of supply 2=lack of quality supply 3=shortage of demand
4=demand fluctuation 5=price fluctuation 6=high input cost 7=financial shortage
8=institutional/policy obstacles (specify)_____ 9=others (specify)_____
26. Transaction and transport costs for the last 12 months

Description	Milk		Butter		Cheese	
	Time (minutes)	Cost (Birr)	Time (minutes)	Cost (Birr)	Time (minutes)	Cost (Birr)
Searching for trading partner (sellers)						
Searching for trading partner (buyers)						
Searching for price information						
Screening for potential partner						
Negotiation (bargaining) to reach agreement						
Enforcement of law(settling case) for breaching contract						
Transport cost (during transporting the product)						
Others (specify) _____						

27. Any other marketing costs in the last 12 months?

Category	Cost per month (in Birr)	Annual cost (in Birr)	Remark
Loss due to spoilage			
Storage cost			
Electricity			
Material (utensil) cost			
Material(utensil) rent			
Taxes			
water			
License registration			
License fees (annual)			
Penalty			
Fuels			
Others costs(specify)			

28. Is there any processors' organization (association) in your locality?

1=Yes 2=No (**Skip to Q-35**)

29. If yes, what is the name of that organization? _____.

30. Are you a member of that organization? 1=Yes 2=No (**Skip to Q-35**)

31. What is the entrance fee (in Birr)? _____.

32. If you are a member, do you get any support from the organization?

1=Yes 2=No (**Skip to Q-34**)

33. If yes, what kind of support do you get from the organization? 1= provision of training on processing 2= market linkage 3=provision of credit/loan
5= others (specify) _____

34. What is the contribution you made to the organization? 1=no contribution
2= in decision making as a member 3= in decision making as a member of the committee
4= others (specify) _____.

35. Means of transport the processor owns? 1=doesn't own 2= bicycle 3=motor cycle
4=motor vehicle 5=others (specify) _____.

Section C: Institutional Aspects

1. Are you aware of any law/regulation concerning milk processing?

1=Yes 2=No (**Skip to Q-4**)

2. If yes, what are the laws/regulations? 1= registration before starting the business
2= taxes for starting business 3= insurance for workers 4= construction of building and waste treatment plants
5=others (specify)_____.

3. Who is responsible on enforcing the above laws? 1= the government 2= the processor association 3=others (specify _____).
4. Is there any regulation/law hindering your business?
1=Yes 2=No (**Skip to Q-5**)
5. If yes, what are these regulations/laws? 1=high tax rate 2=immediate registration after starting business 3= strict quality control 4=unbalanced penalty
5=others (specify)_____.
6. Any breaching of contracts between you and your supplies or buyers?
1=Yes 2=No (**Skip to Q-11**)
7. If yes, what are the breaches? 1=breaking on supply of volume 2= breaking on agreed price 3=breaking on agreed quality 4=breaking on time of delivery
5=others (specify) _____.
8. Who is responsible for breaching the contracted agreements? 1=producers
2=supplier wholesalers 3=supplier small traders 4=village collectors
5=producers' cooperatives 6=seller commission men/broker 7=consumers
8= retailers 9=buyer wholesalers 10=buyer commission men/broker 11=health institutions 12=education institutions 13=the processor 14=hotels
15=others (specify) _____.
9. Is there any action taken to correct the breaching of contracts?
1=Yes 2=No (**Skip to Q-11**)
10. If yes, what was the action taken? 1=penalty on the contract breaker using formal rule 2=penalty on the contract breaker using informal rule (specify) _____ 3= others (specify)_____.
11. Is there any institutional problem (impediment) regarding dairy marketing?
1=Yes 2=No (**Skip to Q-13**)
12. If yes, what are they? 1=absence or shortage of legal protection in case of cheating on prices 2=absence or shortage of legal protection from cheating on weighting scales
3= poor government policy 4=cultural influences 5=Input supply problem
6=Infrastructural (road, telecom, electricity, etc...) 7= Incomplete property rights on land 8=Domination of marketing by few organizations 9= others (specify) _____
13. Do you gather feedback on your product from your buyers?
1=Yes 2=No (**Skip to Q-15**)

14. If yes, what are the feedbacks? 1=satisfaction on the quality 2= satisfaction on the supply 3=still improvement is needed on quality 4= still improvement is needed to increase the supply 5=others (specify) _____.

15. Do you get any support concerning your dairy business?

1=Yes 2=No (**Skip to Q-18**)

16. If yes, source of the support: 1= Government 2=NGO (specify) _____
3=processor's organization/union 4=others (specify) _____

17. What support do you obtain? 1=credit/loan 2=technical training 3=supply of free working area/place for processing 4=purchasing of materials free of tax
5=others (specify) _____.

18. Are you satisfied with your business? 1=Yes 2=No

19. How do you evaluate your relationship with dairy marketing actors regarding dairy marketing? (**Use √ mark**)

Dairy marketing actors	Relationship status with the dairy actors					Remark
	No relation at all	Very weak	Weak	Strong	Very strong	
Dairy producers						
Village collectors						
Traders						
Commission men/brokers						
Cooperatives						
Other processors						
Consumers						
Health institutions						
Education institutions						
Restaurants/hotels/cafe						
Input suppliers						
Government						
Others_____						

20. Is there any governance, infrastructure, or socioeconomic challenges facing your dairy business? 1=Yes 2=No

21. If yes, what are these challenges? (Rank)

1. Governance/policy_____

2. Infrastructure_____

3. Socioeconomic _____

22. Any Opportunities concerning dairy marketing? 1=Yes 2=No. If yes, list and rank

1. _____
2. _____
3. _____

If you have, please your phone No _____

“Thank you very much for your cooperation”

VI. QUESTIONNAIRE FOR CAFES/RESTAURANTS/HOTELS

Date of interview _____

Region: Amhara Zone: _____ District: _____ Kebele: _____

1. Name of Café/Restaurant/Hotel _____
2. Name of respondent _____
3. Position of respondent _____
4. How many liters of milk do you buy per day? _____.
5. What is the price (Birr/liter)? Maximum_____, Minimum _____, Average _____
6. What is the month/season with the highest price of milk? _____
7. What is the month/season with the lowest price of milk? _____
8. Who consumes the milk you bought? 1= Children 2= Youth 3. Elder people 4. All age
9. Volume of milk and milk products bought per month:

Type of product	Unit	Quantity Bought per month	Type of milk (Code)	Remark
1=Milk				
2=Butter				
3=Yoghurt				
4=Cheese				
5=Others_____				
Code B: 1=Raw fresh milk 2=Boiled fresh milk 3=Packed fermented 4=Powder milk 5=Others(specify)_____				

10. Source, share and price of milk and milk products bought:

Product	Unit	1 st supplier (Code)	Share (%)	Price per unit	2 nd supplier (Code)	Share (%)	Price per unit	3 rd supplier (Code)	Share (%)	Price per unit
1=Milk										
2=Butter										
3=Yoghurt										
4=Cheese										
5=Powder milk										
Code : 1=Producer 2=Village collector 3=Cooperative 4=Processor 5=Wholesaler/Retailer 6=Commission men/broker 7= Open market 8=Super market 9=Others(specify)_____										

11. How many regular milk suppliers do you have? _____.

12. What is your preference for choosing your suppliers? 1=Quality of milk 2=Reliable supply 3=Trust (loyalty) 4=Low price 5=Nearness to my home
6=Others (specify) _____

13. Where do you buy the milk? 1=From producer's home 2=From the cooperatives' shops 3=From the processors' shops 4=The seller brings the milk to my home
5=Open market 6=Super market 7= Others (specify)_____

14. What type of milk and milk products do you sell most of the time? 1=fresh raw cow milk 2=fresh boiled cow milk 3=skimmed (non-fat) milk 4=boiled powder milk
5= cheese 6=Yoghurt 7=others (specify) _____

15. Do your buyers of milk complain about the product you sold?

1=Yes 2=No (**Skip to Q-17**)

16. If Yes, what was the complain? _____.

17. Do you obtain the amount of milk you demand? 1=Yes (**Skip to Q-19**) 2=No

18. If no, what is the reason? 1=shortage of supply 2=expensive price 3=low quality 4. Low demand for milk 5=others (specify) _____.

19. Do you provide services to your milk suppliers 1=Yes 2=No (**Skip to Q-21**)

20. If yes, what service do you provide to your suppliers? 1=training (Specify_____)

2=credit 3=consultation 4=materials/utensil 5= transportation

6=others (specify) _____.

21. Do you have contractual agreement with your milk suppliers?

1=Yes 2=No (**Skip to Q-23**)

22. If yes, type, nature, and terms of agreement:

Milk suppliers	Type of contract(A)	Nature of agreement(B)	Terms of agreement(C)
1=Dairy producers			
2=Village collector			
3=Cooperative			
4=Processor			
5=Wholesaler/Retailer			
6=Commission men/broker			
7=Super market			
8=Others _____			

Code:

A = Type of contract	B = Nature of contract	C = Terms of agreement
1= Short term (one month)	1=Formal (written) agreement	1=Specified milk price
2= Medium term (1-6 months)	2=Informal agreement (based on mutual understanding)	2=Specified volume of milk
3= Greater than 6 months	3=Others _____	3=Quality of milk
4=Others _____		4=others _____

23. Who sets the milk price you bought? 1=myself 2=the seller

3=negotiation 4= others (specify) _____.

24. What is the method of payment for your milk purchase? 1=immediate cash payment

2=weekly payment 3=monthly payment 4=others (specify) _____

25. How did you find your supplier? 1= we found each other physically 2= we

found each other by telephone 3= we were arranged by government 4=arranged by NGO 5=by brokers 6=others (specify) _____

26. What challenges do you face during purchasing of dairy products? 1=No

challenges are faced 2=shortage of supply 3=price uncertainty 4=un trusted sellers

5=poor quality of milk 6= unreliable supplier 7= supply fluctuation

8=shortage of marketing linkages 9=others (specify)_____.

27. Have you ever been faced with breaching of contracts?

1=Yes 2=No (**Skip to Q-35**)

28. If yes, what are the breaches? 1=breaking on supply of volume 2= breaking on

agreed price 3=breaking on agreed quality 4=others (specify) _____.

29. Who is responsible for breaching the contracted agreements? 1=Producer

2=Village collector 3=Cooperative 4=Processor 5=Wholesaler/Retailer

6=Commission men/broker 7=Super market 8=Others (specify) _____

30. Is there any action taken to correct the breaching of contracts?

1=Yes 2=No (**Skip to Q-35**)

31. If yes, what was the action taken? 1=penalty on the contract breaker using formal rule 2=penalty on the contract breaker using informal rule (specify)

_____ 3= others (specify) _____.

32. Are the laws enforced as required? 1=Yes 2=No

33. Who is responsible to make sure that laws and responsibilities are enforced?

1= the government 2= the contracted parties 3=others (specify) _____.

34. Are you satisfied with the legal enforcement mechanisms taken to correct the breach?

1=Yes 2=No

35. Is there any institutional problem (impediment) regarding dairy marketing?

1=Yes 2=No (**Skip to Q-37**)

36. If yes, what are they? 1=absence or shortage of legal protection in case of cheating on prices 2=absence or shortage of legal protection from cheating on weighting scales

3. Lack of quality control 4= poor/lack of government policy 5=cultural influences 6=Input supply problem 7=Infrastructural (road, telecom, electricity, etc...) 8= Incomplete property rights on land 9=Domination of marketing by few organizations 10=others (specify) _____

37. How do you evaluate your relationship with dairy marketing actors regarding dairy marketing? (**Use √ mark**)

Dairy marketing actors	Relationship status with the dairy actors					Remark
	No relation at all	Very weak	Weak	Strong	Very strong	
Dairy producers						
Village collectors						
Traders						
Commission men/brokers						
Cooperatives						
Processors						
Consumers						
Health institutions						
Other cafes /restaurants/hotels						
Government						
Others_____						

38. Any suggestions concerning dairy marketing?

If you have, please your phone No _____

Thank you for your cooperation!!

VII. Checklist for Group discussion with dairy producers

Date of interview _____

Region: Amhara **Zone:** _____ **District:** _____ **Kebele:** _____

1. How do you evaluate the dairy value chain? (From the input suppliers such as financial, improved cow breeds, veterinary services and drugs, and feed) through the output marketing systems to the end consumers) and who is the most powerful actor in the value chain?
2. What is the role of formal institutions (such as government laws, policies, regulations or interventions) and their disadvantages in the dairy marketing?
3. What is the role of informal institutions and their disadvantages in dairy marketing?
4. How do you evaluate the relationship/and or interaction of dairy producers with the following dairy marketing actors (regarding dairy marketing)?
 - A. with other dairy producers
 - B. with dairy traders
 - C. with cooperatives
 - D. with processors
 - E. with consumers
 - F. with health institutions
 - G. with education institutions
 - H. selling in open market
5. What are the problems (constraints) you assume in dairy production and in dairy marketing?
 - in dairy production
 - in dairy marketing

6. What solutions do you suggest for the above problems (constraints)?
 - for dairy production
 - for dairy marketing
7. What laws do exist that:
 - promote dairy marketing
 - hinder dairy marketing
8. Who is your preference for selling your milk? Why?
9. What is the current situation in market arrangements and contractual agreement with milk buyers?
10. What are the opportunities in dairy production and marketing?
11. How do you evaluate the transaction cost in affecting from getting high prices for your milk?

VIII. Checklist for Group discussion with traders

Date of interview _____

Region: Amhara **Zone:** _____ **District:** _____ **Kebele:** _____

1. How do you evaluate the current dairy value chain?
2. Who are the most powerful actors in the dairy value chain? Why?
3. What are the major constraints in the dairy production and dairy marketing?
 - in dairy production
 - in dairy marketing
4. What are the opportunities in dairy marketing?
5. What are the institutional impediments in dairy marketing?
6. Who is responsible for the above impediments?
7. How do you evaluate the quality and quantity trend of dairy? And who is responsible for (if the trend is declining)?
8. From whom do you purchase dairy products usually? Why?
9. What kind of support do you provide to your suppliers?
10. To whom do you sell dairy products usually? Why?
11. How do you evaluate the contractual agreement between you and your suppliers/buyers?

IX. Checklist for Key Informants (Zone and District Dairy Experts)

Date of interview _____

Region: Amhara **Zone:** _____ **District:** _____ **Kebele:** _____

1. Name of Expert _____ Phone No _____
2. How do you evaluate the dairy production and Dairy marketing in your district? And why if the trend is declining?
 -Dairy Production
 -Dairy Marketing
3. What are the threats for the dairy extension service and input supply? And who is responsible for this?
4. What are the most important constraining infrastructures or other institutional factors affecting dairy marketing?
5. What are the possible solutions to improve these constraints?
6. What is the role of FTC in dairy production and marketing?

X. Checklist for dairy marketing stakeholders/Organizations/Government officials/credit institutions

Date of interview _____

Region: Amhara **Zone:** _____ **District:** _____ **Kebele:** _____

1. Name of respondent _____ Phone No _____
2. Job title _____
3. Name of Organization _____
4. Year of establishment _____
5. What is the contribution of your organization in dairy marketing?
6. How do you describe the current status of milk value chains in your district?
7. How do you evaluate the relationship/interaction between your organization and the dairy marketing actors?
8. What kind of support does your organization provide to dairy marketing actors (E.g. credit, market information, and training)?
9. What criteria do you consider in providing support to dairy marketing actors?
10. What are the institutional environments (such as formal laws, by laws, regulations) that govern milk production, processing, transporting, and marketing..., in your district?

11. Are there any contractual agreement between your organization and other actors in dairy marketing? Yes/No. If there are contractual agreements, what is the kind of contract and with whom?
12. What do you think are the major constraints in dairy marketing (including in all actors)?
13. Who is responsible for the above constraints?
14. Who do you think is the most powerful actor in the milk value chain and why?

XI. Checklist for Health/Education institutions

Date of interview _____

Region: Amhara **Zone:** _____ **District:** _____ **Kebele:** _____

1. Name of respondent _____ Phone No _____
2. Job title _____
3. Name of Organization _____
4. Year of establishment _____
5. Do you buy milk or milk products for your organization? Yes/No. If you buy, what kind of milk or milk products do you by and from whom and why?
6. What is the contribution of your organization in dairy marketing?
7. How do you describe the current status of milk value chains in your district?
8. How do you evaluate the relationship/interaction between your organization and the dairy marketing actors?
9. What kind of support does your organization provide to dairy marketing actors (E.g. credit, market information, training, etc.)?
10. What criteria do you consider in providing support to dairy marketing actors?
11. What are the institutional environments (such as formal laws, by laws, regulations) that govern milk production, processing, transporting, and marketing in your district?
12. Are there any contractual agreement between your organization and other actors in dairy marketing? Yes/No. If there are contractual agreements, what is the kind of contract and with whom? What is the mode of payment?
13. What do you think are the major constraints in dairy marketing (including in all actors)?
14. Who is responsible for the above constraints?
15. Who do you think is the most powerful actor in the milk value chain and why?