

# SMALL FARMERS' AGRICULTURAL LOAN REPAYMENT PERFORMANCE IN SOUTHERN ETHIOPIA



**M.SENAPATHY, Ph.D.**



**MERIHUN NADEW, M.Sc.**



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*Monograph*

**MERIHUN NADEW, M.Sc.**

**MARISENNAYYA SENAPATHY, Ph.D.**

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Rural farmers often look for credit facilities during the agricultural seasons and other constructive activities. However, most developing countries face the severe challenges of getting enough financial support through proper means. Providing low-cost, efficient credit services and recovering a high percentage of loans granted are the ideal aims in rural finance. On the other hand, low repayment performance discourages the lender from promoting and extending credit. Therefore, thoroughly investigating the various aspects of loan defaults is vital for policymakers and lending institutions. Therefore, this thesis was concerned with analyzing factors affecting the agriculture loan repayment performance of borrowers of agricultural lending institutions of the study area and the effect of credit risk on lending institutions' financial performance. The study was based on secondary data from the District and Zonal Microfinance Institutions and Marketing and Cooperative development departments. Primary data were collected from 140 smallholder agriculture credit borrower farmers. The data were used to describe the respondents' socio-economic, demographic and attitudinal characteristics and institutional factors. T-test and chi-square were used to measure the potential power of continuous and discrete variables in differentiating non-defaulters and defaulters. The logit model was also used to identify variables that determine loan repayment performance. Of 16 explanatory variables, only five: household income, business development services made by the lending institutions, loan disbursement time (suitability of loan disbursement time), loan diversion status of borrowers and celebration of social ceremonies were statistically significant factors affecting repayment performance of agriculture loan of lending institutions. The partial marginal effect analysis shows that borrowers' loan diversion status is the most critical factor among the other five variables. Based on the findings, policy implications were drawn for improving loan repayment performance and sustainability of credit services and institutions in the study areas.

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# PREFACE

## **Introduction**

Farmers in developing countries face many challenges to be successful in agricultural activities. One of the biggest challenges is the leading root cause of the money to trigger productive economic activities in agriculture. Agri-finance is the primary key to executing all other productive activities in agriculture. Agricultural or farm credit is a crucial input required by smallholder farmers to establish and expand their farms to increase their agricultural production, enhance food sufficiency, promote household and national income, and increase the individual borrower's ability to repay the borrowed fund. Many local money lenders and Microfinance Institutions are rendering finance lending services, but it is not up to the mark. It enables poor farmers to connect to financial resources and take advantage of their immediate environment's potentially profitable investment opportunities. Financial sustainability, which is the capacity of financial institutions to generate enough profit to become economically viable, is another important aspect of lending institutions that enables them to satisfy the supply side of the credit market. It is measured in terms of the capacity of institutions to generate enough overall revenue cost. Loan repayment is an essential criterion in assessing a financially sustainable credit program.

## **Literature Review**

Credit is necessary for a dynamic economy because it elapses between producing a good and its ultimate sale and consumption. The risk in extending credit is the probability that future borrower payments will not be made. Futurity is thus a fundamental characteristic of credit, and risk is necessarily associated with the time element. There are private and governmental organizations regarding financial institutions that accumulate funds from savers and channel them to individuals, households, and businesses, that need credit. Default on borrowed funds could be voluntary or involuntary. Involuntary default on borrowed funds could arise from unfavourable circumstances that may affect the ability of the borrower to repay.

On the other hand, voluntary default, whereby a borrower does not repay even if he/she can do so. Therefore, the lender must understand the causes and possible default solutions. A particular research study was conducted on the determinants of loan repayment performance of smallholder farmers in North Gondar, Ethiopia. To analyze the factors that affect loan repayment, he employed the Tobit model. A total of 17 explanatory variables were considered in the econometric model. Out of these, seven variables were found to influence repayment performance significantly. These were land holding size of the family, agro-ecology of the area, total livestock holding, years of experience, contacts, sources of credit and income from off-farm activities.

## **Methodology**

The study was conducted in Sodo Zuria District from March to September 2013. Sodo Zuria district is one of the 12 rural districts of the Wolaita zone. The total population of the district is (male 92,542, female 96,573) 189,115. The district's total area is 40,805 hectares, of which 27,657 ha is used for farming and the remaining 13,148 ha for forests and bushes. The district has two agro-ecological zones, out of which highland accounts for 5% and 95% midland. The economy of the district is mainly based on mixed farming. For this study, a multi-stage sampling technique was employed. In the first stage, the Sodo Zuria district was selected purposively among 12 rural districts of the Wolaita zone due to the availability of all agricultural credit service institutions in all 31 rural kebeles. In the 2<sup>nd</sup> stage, a simple random sampling technique selected six kebeles from 31 rural kebeles. In each selected Kebele, smallholder farmers who borrowed agricultural loans from more than one agricultural credit lending institution were stratified into defaulters and non-defaulters. The sample size for each kebele and study unit was fixed based on the probability of proportionate sampling. Finally, the total sampled respondents were selected: the defaulters 84 and the Non-defaulter 56. The Dependent variable was a dummy variable, which took a value of zero or one depending on whether or not a borrower defaulted. The logit model was used. The Sensitivity Analysis estimates the model's parameters using the iterative maximum likelihood estimation procedure. Parameter Estimation is to fit the logistic regression model, the estimation of the values of the unknown parameters  $\alpha$  and  $\beta_i$ 's are required.

The Financial Performance measurement such as Liquidity, Solvency, Indebtedness and return on investment was calculated.

## **Results and Discussion**

The descriptive analysis uses tools such as mean, percentages and standard deviation. In addition, the t- and chi-square statistics were employed to compare the defaulters and non-defaulters groups concerning some explanatory variables. Econometric analysis was carried out to identify the most critical factors affecting loan repayment performance and measure the relative importance of significant explanatory variables on loan repayment performance. Finally, the financial performance of agricultural credit service-providing institutions in the study area was assessed to see its effect on the loan collection performance of the institutions. The following Explanatory variables such as age, off-farm income, Loan diversion, Experience in formal credit use, Farm size, Dependency ratio, Educational level, Total livestock ownership, Health care expenditure, Amount of credit borrowed, Celebration of Social ceremonies, Interest rate, Business Development service, Type of loan, Timing of loan disbursement s and borrowers attitude towards borrowed resource were measured, and the significant variables were identified finally.

## **Summary**

Using these improved technologies demands more capital than the farmers can afford. There is a wide gap between owned and required capital to finance these technologies since subsistence agriculture has no surplus beyond family consumption and other essential obligations for most households. Furthermore, there is a time gap between incurring production expenses and receiving farm income in the agricultural production process.

## **Policy Implications**

Loan recovery is essential for all financial institutions involved in lending money. The consequence of the loan diversion status of credit users decreases the repayment performance of the borrowers. The availability of regular follow-up/ supervision of borrowers' activities should be considered a significant part of credit activity because a

borrower who gets information and advice from the lending institution is more likely to be a non-defaulter. The suitability of loan diversion time for borrowers significantly impacts repayment performance. So to reduce the default rate, the agricultural lending institution should improve the appropriateness of loan disbursement time for its borrower.

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Recent technological developments such as explosive growth of the Internet and www, sophisticated search engines, fast processing power and reduced cost of computers, high bandwidth networks and an increasing number of electronic publications assist the libraries in providing extensive access to a variety of information sources and provide a way to enrich the teaching and learning environment. As a result, worldwide libraries face changes in the concept, organization, functioning and management of library and information systems worldwide. Modern Digital libraries incorporate new technologies, upgrading information resources to add value to web services and ultimately satisfying the increasing information needs of modern electronic users.

One of our academic faculties Dr.M.Senapathy from the Department of Rural Development and Agricultural Extension, College of Agriculture, Wolaita Sodo University, has taken dynamic steps to publish E-book. It is designed for Graduate students and research scholars abroad pursuing research on Rural Development backgrounds or Sociology or Social work disciplines. Its main aim is to help research scholars looking for African countries' research studies. Those who have chosen the research topic of Rural Development mainly focus on methodological frameworks in their diverse and pluralistic nature and demonstrate their purpose, relevance and effectiveness.

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## **Distinct Advantages of E-Books**

This E-Book has many distinctive features. First and foremost, the Rural Development and Agriculture-related research titles have been compiled and contributed to world readers and users in general. This E-Book has ten chapters: Introduction, Literature Review, Methodology, Results and Discussion and Summary, Conclusion and Recommendations, References, Appendices, Ethiopian Key Technical Terms, Glossary and Subject Index including Appendices. In this sense, the E-Book is concise and comprehensive and offers a complete research analysis of the particular research title of information in a relatively small space.

The E-book enlightens the knowledge of budding research scholars/Graduate students at the M.Sc. and Ph.D. levels. It also covers many relevant literature reviews, detailed information about the study area and methodology, and statistical tools applied with final results with recommendations. Finally, the E-Book presents social research as a dynamic process leading from beginning to end, showing how researchers progress from one stage to the next, how decisions are made, how sampling methods are selected, and how conclusions and recommendations are drawn.

The E-Book offers Graduate students the need to know about social research: what it is, what it does, how it is used when it is used and for what purpose, what methods it employs and a critical understanding of rural locality-based research. Such an intensive analysis may be accomplished through further reading to update the modern trends in research. As a result, Social work, psychology, anthropology, and other social sciences have been focused on in general.

Ideally, this E-book is prepared for beginners who wish to understand the Master Thesis and intend to conduct an elementary investigation. Nevertheless, an intelligent scholar may find the E-Book a good model for ordering, categorizing and integrating the embodiment of complete research knowledge in the social sciences.

At the outset, I appreciate the earnest endeavours of our faculty Dr.M.Senapathy who always supports our students in teaching, guiding and motivating them morally and

intellectually. I hope this E-Books publication output will impart a new E-learning opportunity platform to our students in Ethiopia.

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# LIST OF ABBREVIATIONS

<b>AEMFI</b>	: Association of Ethiopian Microfinance Institutions
<b>CDF</b>	: Cumulative Density Function
<b>CSA</b>	: Central Statistics Agency
<b>FAO</b>	: Food and Agricultural Organization
<b>HAB</b>	: Household Asset Building
<b>MFI</b>	: Microfinance Institution
<b>ML</b>	: Maximum Likelihood
<b>MoFED</b>	: Minister of Finance and Economic Development
<b>MPC</b>	: Multi-Purpose Cooperative
<b>NBE</b>	: National Bank of Ethiopia
<b>NGO</b>	: Non-Governmental Organization
<b>NSA</b>	: National Statistics Agency
<b>OLS</b>	: Ordinary Least Square
<b>OMFI</b>	: Omo Microfinance Institution
<b>RSCCOs</b>	: Rural Saving and Credit Cooperatives
<b>SNNPR</b>	: South Nations Nationalities and Peoples' Region
<b>ROA</b>	: Return on Asset
<b>TLU</b>	: Tropical Livestock Unit
<b>VIF</b>	: Variance Inflation Factor
<b>WMFI</b>	: Wisdom Microfinance Institution

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# AGRICULTURAL LOAN REPAYMENT PERFORMANCE OF SMALLHOLDER FARMERS IN SOUTHERN ETHIOPIA

## ABSTRACT

*Rural farmers often look for credit facilities during the agricultural seasons and other constructive activities. However, most developing countries face the severe challenges of getting enough financial support through proper means. Providing low-cost, efficient credit services and recovering a high percentage of loans granted are the ideal aims in rural finance. On the other hand, low repayment performance discourages the lender from promoting and extending credit. Therefore, thoroughly investigating the various aspects of loan defaults is vital for policymakers and lending institutions. Therefore, this thesis was concerned with analyzing factors affecting the agriculture loan repayment performance of borrowers of agricultural lending institutions of the study area and the effect of credit risk on lending institutions' financial performance. The study was based on secondary data from the District and Zonal Microfinance Institutions and Marketing and Cooperative development departments. Primary data were collected from 140 smallholder agriculture credit borrower farmers. The data were used to describe the respondents' socio-economic, demographic and attitudinal characteristics and institutional factors. T-test and chi-square were used to measure the potential power of continuous and discrete variables in differentiating non-defaulters and defaulters. The logit model was also used to identify variables that determine loan repayment performance. Of 16 explanatory variables, only five: household income, business development services made by the lending institutions, loan disbursement time (suitability of loan disbursement time), loan diversion status of borrowers and celebration of social ceremonies were statistically significant factors affecting repayment performance of agriculture loan of lending institutions. The partial marginal effect analysis shows that borrowers' loan diversion status is the most critical factor among the other five variables. Based on the findings, policy implications were drawn for improving loan repayment performance and sustainability of credit services and institutions in the study areas.*

**Keywords:** Agricultural credit, Loan repayment, Collateral, Logit model, and smallholder farmers.

# CHAPTER I

## 1. INTRODUCTION

# 1.INTRODUCTION

## 1.1. Background of the study

In subsistence agriculture and low-income countries like Ethiopia, smallholder farming dominates the overall national economy; smallholder farmers work on 96.3 per cent of the total cultivated area and produce over 95 per cent of the national crop production (CSA, 2008). However, smallholder farmers face a severe shortage of financial resources to purchase productive agricultural inputs. The prices of inputs rise very rapidly every year. Consequently, the hope of smallholder farmers on financial institutions for credit has recently become substantially higher.

Agricultural or farm credit is a crucial input required by smallholder farmers to establish and expand their farms to increase agricultural production, enhance food sufficiency, promote household and national income, and increase the individual borrower's ability to repay the borrowed fund. It enables poor farmers to connect to financial resources and take advantage of their immediate environment's potentially profitable investment opportunities (Zeller and Sharma, 1998). Generally speaking, credit accessibility is essential for improving the quality and quantity of farm products to increase farmers' income and reduce rural migration. Click here (<https://www.youtube.com/watch?v=glCtXqfxMRA>)

On the other hand, lending is a risky enterprise because repayment of loans can seldom be fully guaranteed. Generally, despite the importance of loans in agricultural production, their acquisition and repayment are filled with many problems, especially in smallholder farming. It is reported in empirical studies that a significant default rate has been a perennial problem in most agricultural credit schemes organized or supported by the governments. Most of the defaults arose from inadequate loan management procedures, loan diversion and a lack of business development service providers. For this reason, lenders devise various institutional mechanisms to reduce the risk of loan default. In providing credit to the rural asset-poor, institutional innovation is required that combines wise and sustainable lending principles with adequate screening and monitoring strategies that are not based on physical collateral (such as land).

Improving repayment rates helps reduce the lending institutions' dependence on subsidies, improving sustainability. It is also argued that high repayment rates reflect the adequacy of credit services to the client's needs (Godquin, 2004). In contrast, the annual report of 2012 indicates that the agricultural credit lending institutions of the Wolaita zone are found in a severe problem of nonperforming loans, that is, 78% of the total loan portfolio of the institutions. This shows very far below the accepted international standard (single-digit ratio). This impacts the sustainable provision of credit to poor smallholding farmers and the existence of financial institutions. So loan recovery is regarded as the most critical factor affecting the liquidity and profitability of financial institutions.

Financial sustainability, which is the capacity of financial institutions to generate enough profit to become economically viable, is another important aspect of lending institutions that enables them to satisfy the supply side of the credit market. It is measured in terms of the capacity of institutions to generate enough overall revenue cost. Loan repayment is an essential criterion in assessing a financially sustainable credit program. However, the probability of default is very high in developing countries with a weak legal mechanism to enforce contracts and little opportunity for collateral before advancing loans (Ray, 1998). Therefore, low repayment performance jeopardizes the sustainability of lending institutions.

These borrowed funds from the lending institution must be invested for productive purposes. Then the generated additional income will be used to repay the lending institutions for a sustainable and viable production process. However, failure by farmers to repay their loans on time or to repay them at all has been a severe problem faced by both agricultural credit lending institutions and smallholder farmers. Poor loan repayment in developing countries has become a significant problem for agricultural credit administration, especially for smallholders with limited collateral capabilities.

Providing low-cost, efficient credit services and recovering a high percentage of loans granted are the ideal aims in rural finance (Wenner, 1995). This is because low repayment performance discourages the lender from promoting and extending credit to large and fragmented farm households. Therefore, a thorough investigation of the

various aspects of loan defaults has great importance for policymakers and lending institutions. Hence, this study was undertaken to analyze how default and non-default rates are associated with different personal, socio-economic and institutional characteristics of smallholder agricultural credit borrowers and the effect of credit risk on the financial performance of agricultural credit lending institutions in the Sodo Zuria district, Southern Ethiopia.

## **1.2. Statement of the Problem**

In smallholder agriculture and low-income countries, like Ethiopia, where smallholder farming dominates the overall national economy, smallholder farmers often face a scarcity of capital due to low production levels to adopt new agricultural technologies. Hence, short-term credits with favourable terms for seasonal inputs, like fertilizer, improved seeds, pesticides, herbicides and working tools, would generally be favoured because a better return would be achieved quickly within the cropping season. Moreover, achieving household food security remains a significant objective of rural development. This can be materialized by increasing agricultural productivity and off-farm income and improving households' ability to stabilize their income and food purchasing power. Click here (<https://www.youtube.com/watch?v=LeDA5pU6HEQ>)

However, the provision of credit alone does not support the country's economic development unless it is accompanied by the factor necessary for efficiently using the fund to repay the loan following the agreement. This impacts sustainable credit facilities for those who want the loan for a productive purpose. The loan recovery rate of agriculture credit providers in the Wolaita zone was 22% on December 31, 2012. This shows that the zone's agricultural credit lending institutions have a low recovery rate compared to the international level above 90%. The relationship between the credit service providers and their clients will be good if there is a high repayment rate. Bond and Rai (2009) argue that the high repayment rate helps obtain the following higher loan and other financial services.

In contrast, the borrowers and credit service providers will be affected if there is a low repayment rate. In this case, the borrowers will not obtain the next higher loan, and the

lenders will also lose their clients. So, the credit scheme lacks sustainability and a viable production process.

Loans from credit lending institutions: vary from country to country, region to region, and sector to sector. However, most credits of developing countries were found to share one common characteristic: they suffer from a considerable amount of default rate (the number of loans not collected on current and past-due loans for the reference period) (Kashuliza, 1993).

Moreover, factors contributing to smallholder farmers' poor loan repayment performance are not studied in the study area. Therefore, information on the relative importance of the factors affecting smallholder farmers' loan repayment performance is necessary to design appropriate lending strategies and procedures.

### **1.3. Objectives of the Study**

#### **1.3.1. The General Objective of the Study**

The study's general objective is to identify factors affecting smallholder farmers' agricultural loan repayment performance.

#### **1.3.2. The Specific Objectives of the Study**

- To assess the financial performance of agricultural lending institutions in the study area and
- To identify factors affecting the agricultural loan repayment performance of smallholder farmers in the study area

### **1.4. Research Questions**

The following research questions are taken as critical instruments to achieve the objectives.

1. How do agricultural credit lending institutions perform?

2. What factors are responsible for smallholder farmers defaulting on agricultural credit?
3. Is there any attitudinal difference, regarding credit repayment, among smallholder borrowers of the study area?

### **1.5. Significance of the Study**

Agricultural credit-providing institutions are essential for poverty reduction and creating employment opportunities, especially, in developing countries, like Ethiopia. One of the critical factors for the profitability and sustainability of lending institutions is reasonable loan repayment rates. Several socio-economic and institutional factors affect loan repayment rates. Analyzing such factors and developing appropriate solutions are essential to sustain agricultural credit institutions' activities. This study tries to understand better the loan repayment performance of agricultural credit institutions from lenders and borrowers. This study's primary advantage is establishing a knowledge base, which enables one to make sound decisions and take corrective action. In addition, the information will enable effective measures to be undertaken to improve loan repayment performance and the success of agricultural credit programs. It will also enable lenders such as Microfinance Institutions, Rural Cooperatives, and policymakers to know where and how to channel efforts to minimize loan defaults. This study also provides baseline information for further research work and development activities to benefit the smallholder farmers in the study area.

### **1.6. Scope and Limitations of the Study**

The study aims to identify the factors associated with default and the relative importance of factors associated with loan repayment performance of the smallholder farmers who benefited in 2012/2013 from more than one credit-providing institution. It refers to the Sodo Zuria district agricultural credit providing institutions in six Peasant Associations of the Wolaita Zone. However, not all the borrowers were included in the survey. This limitation is attributable to financial, time and other resource limitations. Therefore, the study is undertaken to meet its objectives within the limitations mentioned above.

## **1.7. Organization of the study**

This thesis constitutes five chapters. The first introductory chapter, including the subtopics discussed, includes background, statement of the problem, study objectives, research questions, significance and scope and limitations of the study. The second chapter reviews some theoretical and practical concepts related to agricultural loans. A brief description of the study area and a thorough explanation of the methodologies used for the study are presented in chapter three. Chapter four presents the study's findings in the results and discussions. Finally, chapter five deals with the summary and policy implications that are drawn from the study.

# CHAPTER II

## 2. REVIEW OF PERTINENT LITERATURE

## 2. REVIEW OF PERTINENT LITERATURE

### 2.1. Definition and Concept

#### 2.1.1. Credit

Beckman and Foster (1969) defined credit as the power or ability to obtain goods or services in exchange for a promise to pay for them later. In other words, it is the power or ability to obtain money, through the borrowing process, in return for a promise to repay the obligation in the future. According to these authors, credit represents the actual or prospective debtor's power or ability to affect an exchange by offering his promise for future payment. Credit is necessary for a dynamic economy because it elapses between producing a good and its ultimate sale and consumption. The risk in extending credit is the probability that future borrower payments will not be made. Futurity is thus a fundamental characteristic of credit, and risk is necessarily associated with the time element. In addition, private and governmental organizations regarding financial institutions accumulate funds from savers and channel them to individuals, households, and businesses needing credit.

Financial institutions are composed of deposit-type institutions-bank and non-bank-contractual saving institutions, personal and business financial companies, government and quasi-government agencies, and miscellaneous lenders. Formal financial institutions can be defined as institutions regulated by the central bank's supervisory authorities for licensing and credit policy implementation. Formal loans are disbursed by financial institutions set up legally and engaged in credit and savings mobilisation. These institutions are regulated and controlled by the National Bank of Ethiopia (NBE) in the Ethiopian context. On the contrary, informal loans are provided by individuals, organizations and institutions that operate outside the legal banking system and are under the control of the National Bank.

According to Bekele (1995), informal credit sources are categorized as commercial (those who lend money on a short-term basis to obtain profit) and non-commercial (lenders that generally include friends, relatives and neighbours). Mutual help associations include Iddir, Iqqub, modern cooperatives, NGOs, etc. Informal finance

comprises all lawful but unregulated activities, such as rotating and non-rotating savings and credit associations, moneylenders and money collectors and other providers of retail financial services. Default is failing to pay a debt or a loan at the right time. On the contrary, non-default is defined as the payment of a debt or a loan at the right time. Hulme (1996) defined credit-worthy (synonymous with non-defaulter) borrowers as those who satisfy the entire loan contract conditions and repay their loans without ever going into arrears. Non-credit-worthy (defaulters), instead of non-defaulters, breach their loan contracts and have repayment problems.

This study adopts the definition of agricultural credit as defined by Ozawa (2007): “agricultural credit encompasses all loans and advances granted to borrowers to finance and service production activities relating to agriculture, fisheries and forestry and also for processing, marketing, storage and distribution of products resulting from these activities”. The definition of a smallholder farmer as defined by Kirsten and Van Zyl (1998) was adopted by this study: “a smallholder farmer is one whose scale of operation is too small to attract the provision of the services he/she needs to be able to increase his/her productivity significantly”.

## **2.2. Theoretical literature**

### **2.2.1. The functioning of the credit market in developing countries**

The fundamental feature that creates imperfection in credit markets is informational constraints. Ray (1998) stated that the informational gap occurs at two basic levels. First, there is a lack of information regarding the use to which a loan will be put. Second, there is a lack of information regarding borrowers' repayment decisions and limited knowledge of the defaulter's subsequent needs and activities. All the essential features of credit markets can be understood as responses to one or the other of these informational problems. In addition, Behrman J and Srinivasan (1995) stated the arising agency problem in the functioning of the credit market. This problem exists when there are different goals between creditors, shareholders and management. Financial intermediaries may reduce agency problems by monitoring borrowers and making wise investment choices.

Adverse selection and moral hazard are the two most important problems in the functioning of the credit market; both drive imperfect information. Kono and Takahashi (2010) also stated that imperfect information significantly increases default risks caused by adverse selection, moral hazard and strategic default. These theoretical micro-foundations have motivated the microfinance movement to fight poverty and promote growth by expanding access to credit. Billions of subsidies, and countless other resources, have been allocated to such efforts (Karlan and Zinman, 2006). According to Armendariz and Morduch (2010), both problems are worsened by the difficulty of enforcing contracts in regions with weak judicial systems. Click here (<https://www.youtube.com/watch?v=WBGC73K9I9E>)

Adverse selection occurs when the lender cannot quickly determine which customers are riskier than others. Therefore, lenders would like to charge riskier customers more than safer customers to compensate for the added probability of default. However, the problem is that the lender does not know who is who, and raising average interest rates for everyone often drives safer customers out of the credit market (Armendariz and Morduch, 2010). On average, those who are willing to repay at a high-interest rate may be worse risky; they are willing to borrow at high-interest rates because they perceive their probability of repaying the loan to be low (Stiglitz and Weiss, 1981).

A moral hazard arises because banks cannot ensure that customers make the effort required for their investment projects to succeed. A moral hazard arises when customers try to abscond with the bank's money (Armendariz and Morduch, 2010). Without collateral, the lender and borrower do not have the same objectives because the borrower does not fully internalize the cost of project failure. Moreover, the lender cannot stipulate how the borrower should run the project (Berhanu, 2005). Clients who borrow money from the lender promise to work hard and repay the loan.

Nevertheless, once the loan is disbursed, the borrower might not keep their promise and change their behaviour. On the other hand, during the activities, the borrower's business failed, and he/she was declared a defaulter. In this case, a lender may not know whether this failure was due to uncontrollable factors or putting less effort into the business activities and borrowers mishandling the loan.

Karlan and Zinman (2006) stated that a better understanding of information asymmetries is critical for lenders and policymakers. For instance, adverse selection problems should motivate policymakers and lenders to consider subsidies, loan guarantees, information coordination, and enhanced screening strategies. On the other hand, moral hazard problems should also motivate policymakers and lenders to consider legal reforms in liability and enhanced dynamic contracting schemes.

Armendariz and Morduch (2010) stated that information asymmetry problems could be eliminated if lenders had cheap ways to gather and evaluate information on their clients and enforce contracts. However, lenders typically face relatively high transaction costs when working in poor communities since handling many small transactions is far more expensive than servicing one significant transaction for a richer borrower. Another potential solution would be if borrowers had marketable assets to offer as collateral. In this sense, the borrower's asset covered any problem on the loan. Thus, the lender could lend without risk. However, the starting point for microfinance is that new ways of delivering loans are needed precisely because borrowers are too poor to have much in the way of marketable assets. However, Behrman and Srinivasan (1995) stated that one way for the government to improve enforcement conditions for credit markets is to improve the possibilities for usable collateral sources like land registration.

In addition, (Berhanu 2005) stated that the problem of moral hazard is solved in formal sector poverty lending by tying credit and saving together, by having a built-in mechanism for an emergency fund to handle unforeseen shocks due to market failure and price changes, and by its emphasis on borrower-initiated lending to avoid loan use in risky unknown ventures where markets or input supplies are uncertain.

To overcome the problems associated with the lack of information, the group lending scheme takes advantage of local information, peer support, and, if needed, peer pressure. The group members may have better information about individuals' efforts and/or abilities than the lender (Besley and Coate, 1995). Besides, the joint liability element generates individual incentives to screen (mitigating adverse selection), monitor each other (mitigating moral hazard) and enforce repayment (Tesfay, 2009). Moreover, dynamic incentives help generate information by starting with small loans

and gradually increasing loan size as customers demonstrate reliability (Armendariz and Morduch, 2010).

### **2.2.2. Causes and possible solutions of default**

Default on borrowed funds could be voluntary or involuntary. Involuntary default on borrowed funds could arise from unfavourable circumstances that may affect the ability of the borrower to repay. On the other hand, voluntary default, whereby a borrower does not repay even if he/she can do so (Stiglitz and Weiss, 1981). Therefore, the lender must understand the causes and possible default solutions. According to Norell (2001), the most common reasons for the existence of defaults are the following: if the Micro Finance Institution (MFI) is not serious about loan repayment, the borrowers are not willing to repay their loan; the MFI staffs are not responsible to shareholders to make a profit; clients' lives are often full of unpredictable crises, such as illness or death in the family; if loans are too large for the cash needs of the business, extra funds may go toward personal use; and if loans are given without the proper evaluation of the business (Norell, 2001).

To achieve self-sufficiency, reducing the default rate is crucial for any MFIs. MFIs can take some actions to reduce the default rate or the amount of arrears. Norell (2001) writes about some strategies for preventing or reducing default. Training the clients before the transaction of each loan and financial incentives for the credit officers can lower the default rates. The incentive from the promise to access the subsequent loans also helps with timely repayment and reduces default.

In addition, quick follow-up visits right after a missed payment and solid solidarity groups are also vital in preventing a high default rate. Limiting geographic scope reduces time and money wasted travelling from the office to clients' businesses. If credit officers have a specific geographic region, they can visit clients more often, and it helps develop relationships in their neighbourhoods. The loan should be given to borrowers who have been in business for at least twelve months. Businesses are most likely to fail within the first year of operation. If the business existed for at least one year on the

Owner's equity, the loan from MFI should be a lower risk than if the business is a start-up. Some MFIs use six months as a minimum, others three. It is identified that the lower the number of months, the higher the risk for the MFI Norell (2001). Click here (<https://www.youtube.com/watch?v=ZxC0caAlljg>)

Norell agrees on the four categories of the client in the MFIs: (1) willing and able to repay, (2) willing but unable to repay, (3) unwilling but able to repay, and (4) unwilling and unable to repay. Credit officers should visit each late payer for very delinquent loans (group loans over five weeks without payment, individual loans at sixty days without payment). The credit officer should classify the client into one of the above four categories. Based on the classification of borrowers, the loan officer should take corrective action. The appropriate action taken by the loan officer in each category is: (1) having the credit officer and the supervisor visit the client's business, (2) rescheduling should be considered for clients with a perfect excuse, (3) the institution can pursue legal action or inform the community and influential persons of clients' unwillingness to repay. Because religious and community leaders can push them to pay, their names can be publicly posted and (4) following up on such groups is a poor use of staff time. They are best referred to as debt collectors or written-off loans (Norell, 2001).

### **2.3. Empirical studies on loan repayment performance**

Loan repayment performance is affected by many socio-economic and institutional factors. While some factors positively influence loan repayment, others negatively affect the repayment rate. Regarding the loan repayment performance of borrowers, several studies have been conducted in many countries by different authors. Some of the studies are summarized below.

#### **2.3.1. Studies in Ethiopia**

Berhanu (2005) studied the determinants of loan repayment performance of smallholder farmers in North Gondar, Ethiopia. In order to analyze the factors that affect loan

repayment, he employed the Tobit model. A total of 17 explanatory variables were considered in the econometric model. Out of these, seven variables were found to influence repayment performance significantly. These were land holding size of the family, agro-ecology of the area, total livestock holding, years of experience, contacts, sources of credit and income from off-farm activities. The remaining variables (family size, distance between main road and household residence, purpose of borrowing, loan amount and expenditure for social festivals) were found to have an insignificant effect on the loan repayment performance of smallholder farmers.

Abafita (2003) employed a logit model and analyzed the microfinance repayment performance of Oromia credit and saving institutions in Kuyu, Ethiopia. According to his finding, sex, loan size, and dependents are negatively related to loan repayment. On the other hand, age was positive, while age squared turned out to be negative. Income from activities financed by loan, repayment period suitability and loan supervision are positively and significantly related to loan repayment performance. Moreover, loan diversion is significant and negatively related to the loan repayment rate. The negative sign implies the use of diverted funds for nonfarm income-generating purposes.

Assefa (2002) employed a logit model to estimate the effects of hypothesized explanatory variables on the repayment performance of rural women credit beneficiaries in Dire Dawa, Ethiopia. Out of the twelve variables hypothesized to influence the loan repayment performance of borrowers, six variables were found to be statistically significant. These variables include farm size, annual farm revenue, a celebration of social ceremonies, loan diversion, group effect, and borrowers' location from lending institutions.

Abreham (2002) studied loan repayment and its determinants in small-scale enterprise financing in Ethiopia around the Zeway area. The estimation result employs the Tobit model. He found that other sources of income, education, and work experience related to economic activities before the loan enhanced loan repayment. In contrast, the extended loan repayment period negatively influenced the repayment performance. He

also showed in his study that male borrowers are the undermining factors for repayment.

Click here (<https://www.youtube.com/watch?v=liuGno5Utd0>)

Retta 2000, cited in Abafit (2003), employed the probit model for loan repayment performance of women fuel wood carriers in Addis Ababa. His finding indicates that loan supervision, suitability of repayment period, and other income sources encourage repayment, reducing the probability of loan default. At the same time, educational level is negatively related to loan repayment.

### **2.3.2. Studies in other countries**

Bhatt and Tang (2002) studied the determinants of loan repayment in micro-credit evidence from programs in the United States. Their study showed that women have a low repayment rate because some women entrepreneurs might have been engaged in high-risk and low-return activities. Godquin (2004) also examined the microfinance repayment performance in Bangladesh. His result is those female borrowers did not prove to have significantly better repayment performance. In addition, the loan size and the borrower's age negatively impacted the repayment performance.

Zeller (1996) analyzed the determinants of repayment performance of credit groups in Madagascar. His finding is that groups with a higher level of social cohesion have a better repayment rate. Moreover, the programs that provide saving services to their members have a significantly higher repayment rate. Olagunju and Adeyemo (2007) and Oke (2007) also analyzed the determinants of repayment decisions among smallholder farmers in southwestern Nigeria. The result showed that the number of visits made by loan officers to the borrowers, higher level of education, and time of loan disbursement would have a better repayment performance. Moreover, borrowers with lower household members would meet their repayment obligation better than those with a high number of household members. Moreover, having access to business-related information and providing training to the clients are increasing the loan repayment rate of the borrowers.

As mentioned above, various studies were conducted on loan repayment performance in different countries. Most of these studies focused on the credit associated with agricultural activities and identified the socio-economic and demographic factors affecting rural households' loan repayment rates. However, in the literature review, nothing was indicated about the institutional factor influencing the loan repayment performance of borrowers. Thus, this research was also focused on institutional factors.

#### **2.4. Conceptual Framework of the study**

The capability of borrowers to repay their microcredit loans is an important issue that needs attention. Borrowers can either repay their loan or choose to default. Borrower defaults may be voluntary or involuntary (Brehanu and Fufa, 2008). According to Brehanu and Fufa (2008), involuntary defaults of borrowed funds could be caused by unexpected circumstances in the borrower's business that affect their ability to repay the loan. Unexpected circumstances include lower business revenue, natural disasters and borrowers' illnesses.

In contrast, voluntary default is related to morally dangerous behaviour by the borrower. In this category, the borrower can repay the borrowed funds but refuses to because of the institution's low enforcement mechanisms (Brehanu and Fufa, 2008). Research has shown that a group lending mechanism effectively reduces borrower defaults. In group lending, the loan is secured by the co-signature of members within the group and not by the lending institution. Each member will pressure the others in the group to meet the loan repayment schedule. Thus, group sanction is vital in discouraging defaults among members in microfinance (Van Tassel, 1999).

Studies on the effectiveness of the group-lending mechanism include Ahlin and Townsend (2007) on Thailand's microcredit borrowers and Olomola (2000) on Nigeria's microcredit borrowers. In addition, Sharma and Zeller (1997) and Zeller (1998) undertook studies on Bangladesh and Madagascar microfinance borrowers, respectively, examining the impact of group characteristics, lender characteristics and

community characteristics on loan default rates. The repayment behaviour among borrowers in the group-lending model was also investigated by Wydick (1999). The author investigated the impact of social ties, group sanctions and peer monitoring on loan repayment behaviour among microfinance borrowers.

Bhatt and Tang (2002) conducted a study investigating the determinants of loan repayments in micro-credit programmes that applied the group lending approach but took a different approach. Bhatt and Tang looked at the borrower's socio-economic variables instead of the elements of group lending for their influence on loan repayment behaviour. The borrower's socioeconomic variables included gender, educational level, household income, and characteristics (type of business, years in business, etc.). Their study found that a higher education level was significant and positively related to better repayment performance. Conversely, female borrowers, level of household income, type of business and borrower's experience had no significant effect on repayment behaviour.

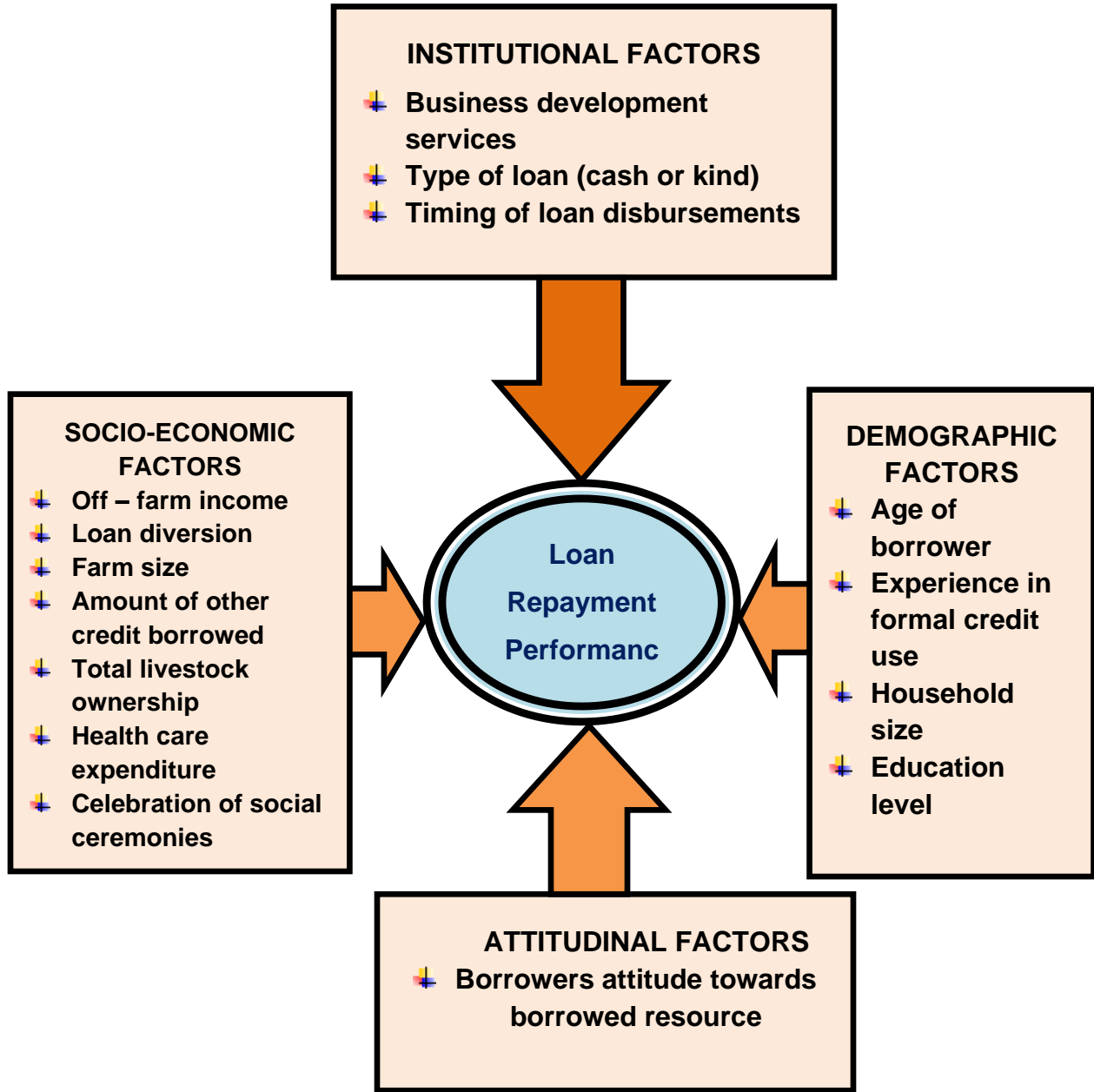
Most previous studies investigating loan repayment defaults in microcredit concentrated more on the effectiveness of group lending in discouraging defaults. However, little study has been conducted on the creditworthiness of the individual lending design applied by microfinance institutions. Studies on the determinants of loan repayment defaults in individual-based lending schemes can be found only in rural banks or semi-formal financial institutions. Chaudhary and Ishafq (2003) examined Pakistan's creditworthiness of 224 rural borrowers. Using the logit model, they found that borrowers with higher educational levels, involved in non-farm business activity, using the loans for investment and were female had a higher probability of repaying their loan. The study found that the subsidized interest rate level did not significantly affect repayment behaviour among rural borrowers in Pakistan. They concluded that a subsidized interest rate was not the best way to ensure reasonable repayment by borrowers.

The determinants of loan repayment rates for agricultural loans were investigated by Brehanu and Fufa (2008). Using probit and logit regression, they studied the repayment

performance determinants among Ethiopia's small-scale farmers. The study found that borrowers with larger farms, higher numbers of livestock, and farms located in a rainfall area had a higher capacity to repay loans. All those factors increased the farmers' productivity and income. The study also found that borrowers with extra business income and experienced agricultural technology had excellent repayment performance. Roslan and Abd Karim (2009) investigated micro-credit loan repayment behaviour in Malaysia. They conducted a study on micro-credit loan borrowers from Agro Bank Malaysia. Agro Bank is a commercial institution specializing in loans to borrowers involved in the agricultural business. [Click here](#)

<https://www.youtube.com/watch?v=nUr8nq2aa8Q>

Besides giving large-scale loans, it also provides borrowers with small-scale, micro-credit loans. Their study found that male borrowers and borrowers with a longer repayment duration had a higher probability of default. Borrowers involved in non-production-oriented business activities such as in the service or the support sectors who had training in their particular business and borrowed higher loans had lower default probabilities. Okorie (1986) studied the repayment behaviour in one agricultural corporation in Nigeria. The author's results from interviews with borrowers showed that the nature of the loan, either cash or in-kind (seeds, fertilizer and equipment), can influence the borrowers' repayment behaviour. He found that borrowers who received a loan in kind had higher repayment rates than borrowers who received a cash loan. Many borrowers misused the cash, diverting it into personal consumption instead of investing in making their business productive. Regular visits by the loan officer to the borrowers' business site and higher profits generated by the borrowers also contributed to higher repayments by borrowers. Overall, loan repayment performance can be influenced by three factors: borrower, business, and lender characteristics. This study is also conceptualized into institutional, socio-economic, demographic and attitudinal factors (Figure 1).



**Figure 1 Conceptual Framework of the Study**

Source: Based on available works of literature

# CHAPTER III

## 3. METHODOLOGY

## 3. METHODOLOGY

### 3.1. Description of the Study Area

Wolaita Zone is one of the 14 Southern Nations Nationalities and Regional State Zones. It is roughly located  $6.4^{\circ}$  -  $7^{\circ}$  N and  $37.4^{\circ}$  -  $38.2^{\circ}$  E. the boundary areas are: Kambata-Tambaro in the Northwest, Hadiya in the North, Sidama Zone in the East, Gamo -Gofa Zone in the South, Dawro Zone in the West and Oromia in the East North. The Zone has a total population of 1,691,867 (CSA, 2000). The area of the Zone is 451,170 hectares or  $4511.7 \text{ km}^2$ . The zone has 12 rural districts and three town administrations. Figure 2, the map of the study area

There are three agro-ecological zones in the zone, out of which high land accounts for 9%, midland 56% and low land 35%; as far as land usage is concerned, 246,962 hectares cultivated, 35888.5 hectares cultivable, grazing 45,577.8 forests and bushes 76,611.71 other purposes 15,424.2 from the zone's total area.

The average maximum and minimum land holding are 0.5 and 0.125 hectares, respectively. The zone has social service sectors of health: 3 hospitals, 65 health centres, and 329 health posts. Education sector; 421 primary schools, 23 secondary schools, 7 preparatory schools, two ATVET and one university. According to the census result of 2007, 294 rural Kebeles and 48 reform towns in Kebeles, and the number of municipality towns in the zone is 22.

The study was conducted in Sodo Zuria District from March to September 2013. Sodo Zuria district is one of the 12 rural districts of the Wolaita zone. The total population of the district is (male 92,542, female 96,573) 189,115. The district's total area is 40,805 hectares, of which 27,657 ha is used for farming and the remaining 13,148 ha for forests and bushes. The district has two agro-ecological zones, out of which highland accounts for 5% and 95% midland. The economy of the district is mainly based on mixed farming.



Figure 2 Map of the Study area

Source: Ethiopian Map Agency, 2011

### 3.2. Sampling Design

For this study, a multi-stage sampling technique was employed. In the first stage, the Sodo Zuria district was selected purposively among 12 rural districts of the Wolaita zone due to the availability of all agricultural credit service-providing institutions in all 31 rural Kebeles. In the 2<sup>nd</sup> stage, a simple random sampling technique was selected from six

Kebeles from 31 rural Kebeles. Each selected Kebele smallholder farmer who borrowed agricultural loans from more than one agricultural credit lending institution was stratified into defaulters and non-defaulters. Finally, the sample size for each kebele and study unit was fixed based on the probability of proportionate sampling.

In sampled six kebeles, 2887 smallholder agricultural credit users from more than one agricultural lending institution and 876 were non-defaulters, and the rest of 2008 were defaulters (Table 1). The list of smallholder farmer agricultural credit borrowers who borrowed from more than one lending institution and their repayment status (Defaulter, Non-defaulter) in 2012 were taken from their respective agricultural credit lending institutions sampled by Kebeles.

**Table 1: Sample Kebeles and number of sampled households**

S. No.	Name of sampled Kebeles	Agricultural credit borrowers			Total sample		
		ND	D	T	ND	D	T
1	Humbo Larena	137	354	491	9	15	24
2	Kokate Mara Charie	124	231	355	8	10	18
3	Waja Kero	161	333	494	10	14	24
4	Tome Gerera	88	424	512	6	18	23
5	Zala Shasha	190	379	569	12	16	28
6	Offa Gandaba	176	287	466	11	12	23
<b>Total</b>		<b>876</b>	<b>2008</b>	<b>2887</b>	<b>56</b>	<b>84</b>	<b>140</b>

Source: Own survey result 2013,

**ND**= Non-Defaulter,

**D**= Defaulter

Using proportionate stratified random sampling, 140 borrowers were selected from the two stratum (Defaulters and Non-defaulters). The stratification of the sample respondents into defaulters and non-defaulter enabled us to investigate factors that affect the credit repayment performance of the borrowers. In addition, all agricultural credit lending institutions in the study area were included to fulfil the second specific objective. Figure 3 shows the sampling procedure of the study.

### Pictorial form of the Sampling Procedure

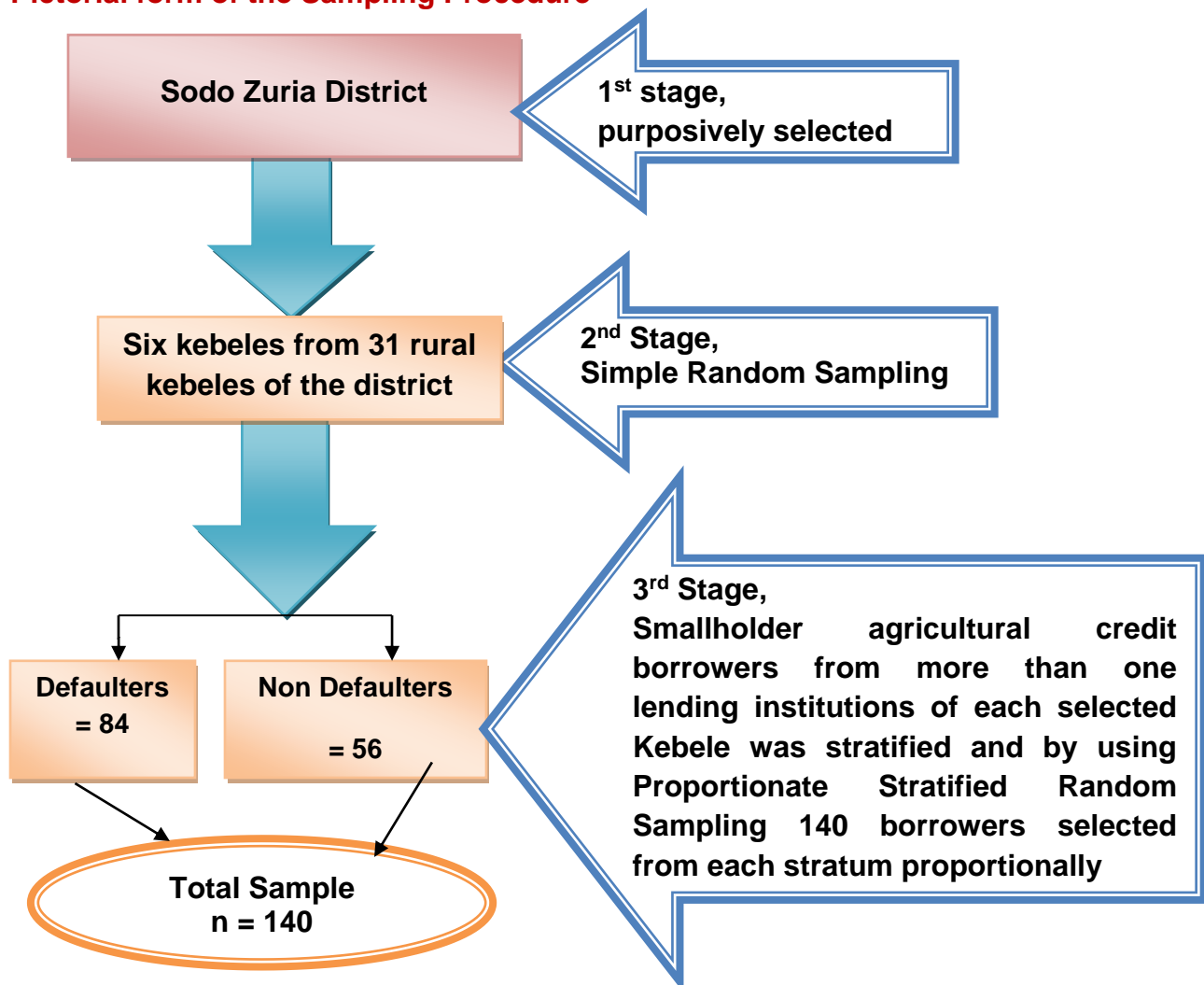


Figure 3 Sampling Procedure

### 3.3. Data Type and Source

This study collected qualitative and quantitative data from primary and secondary sources. Secondary sources include published and unpublished materials about agricultural credit lending institution activities. These materials were collected from the microfinance institutions of the study area, zonal and district-level agricultural cooperative offices, and Kebele posts. In order to assess the factors affecting agricultural loan repayment performance, primary data were obtained through direct interviews with the respondents. The respondents were borrowers and loan officers of agricultural credit lending institutions.

### **3.3.1. Data Collection Tools**

Conducting appropriate data-gathering instruments help researchers to combine the strengths and amend some of the inadequacies of any data source to minimize irrelevant conclusions. Consistent and reliable research indicates that research using appropriate data collection instruments increases the credibility and value of research findings (Koul, 2006). Accordingly, a structured Interview Schedule and checklist were prepared to collect primary data. The Interview Schedule was pre-tested and amended based on the feedback to be reviewed.

### **3.3.2. Method of Data Collection**

Primary data were collected through a survey of borrowers (defaulters and non-defaulters) to assess repayment performance factors. In addition, data have also been collected from loan officers to identify institutional factors affecting loan repayment. Qualitative data have also been collected through Focal Group Discussion (FGD) with key informants and agricultural credit users. Structured document review was used for this research to collect required information, which is relevant for addressing the second specific objective of the study, from audited financial statements of each agricultural credit providing institution and reports of agricultural loan providers', MoFED, and National Statistic Agency (NSA) for the macroeconomic data.

## **3.4. Methods of Data Analysis**

For this research, descriptive statistics summarize the data collected from the sample respondents, such as Frequency, cross-tabulation, mean, standard deviation, and percentages. Also, inferential statistics like the T-test and Chi-square test were used for comparing defaulters and non-defaulters in various explanatory variables. In addition, an econometric regression model was applied to analyze the data.

### **3.4.1. Empirical Models**

Regression models in which the regress and evokes a Yes or No or present or absent response are known as dichotomous, or dummy, dependent variable regression

models. They are applicable in various fields and are used extensively in the survey or census-type data (Gujarati, 1995). The dependent variable in this study is also a dummy variable, which takes a value of zero or one, depending on whether or not the borrower defaults. However, the independent variables of both types are continuous or categorical.

When one or more explanatory variables in a regression model are binary, we can represent them as dummy variables and analyse them. However, applying the linear regression model when the dependent variable is binary is more complex and/or even not efficient (Pindyck and Rubinfeld, 1981). Binary choice models assume that individuals are faced with a choice between two alternatives, and their choice depends on their behaviour. Thus, one purpose of a qualitative choice model is to determine whether an individual with a given set of attributes will make one choice.

The loan repayment performance is a dependent variable, dichotomous, taking on two values, one if the borrower is a non-defaulter and zero otherwise. Estimation of this type of relationship requires the use of qualitative response models. In this regard, the non-linear probability models, viz., logit and probit models, are the possible alternatives. However, several estimation problems arise when Ordinary Least Squares (OLS) regression and linear probability models are employed (Aldrich and Nelson, 1984). For example, when the dependent variable is binary, the OLS regression technique produces inefficient parameter estimates and a heteroscedastic error results in the structure.

Consequently, hypothesis testing and construction of confidence intervals become inaccurate and misleading. Likewise, a linear probability model may generate predicted values outside the 0-1 interval, violating one of the basic tenets of probability. Therefore, the logit and probit models are the most widely used quantitative response models (Amemiya, 1981).

Probit and logit models are similar and yield essentially identical results. However, Aldrich and Nelson (1984) indicated that in practice, these models yield estimated choice probabilities that differ by less than 0.02 and can be distinguished, in the sense of statistical significance, only with extensive samples. Therefore, their choice revolves

around practical concerns such as the availability and flexibility of computer programs, personal preference, experience, and other facilities.

The probit and the logit models are commonly used in studies involving qualitative choices. The probit probability model is associated with the cumulative normal probability function, whereas the logit model assumes cumulative logistic probability distribution. The advantage of these models over the Linear Probability Model is that the probabilities are between 0 and 1. Moreover, they fit best the non-linear relationship between the probabilities of the dependent variable and the explanatory variables; that one approaches zero at slower and slower rates as an explanatory variable ( $X_i$ ) gets smaller and smaller and approaches one at slower and slower rates as  $X_i$  gets larger and larger. Gujarati (1988) and Aldrich and Nelson (1984) have recommended a probit model for functional forms with limited dependent variables that are continuous between 0 and 1 and logit models for discrete dependent variables.

An extension of the probit model is the Tobit model. In Tobit, an example of a general class of models known as censored regression models (also known as limited dependent variable models), the regressand's values are not available for some observations. However, the values of the regressors are available for all the observations. Such models are usually estimated by the maximum likelihood methods (Gujarati, 1995).

In an exhaustive literature survey on agricultural innovation (Feder, Just, and Zilberman, 1985), the probit and logit models appear preferable to discriminant analysis for analyzing studies involving qualitative choices.

#### **3.4.2. Specification of the Logit Model**

This study is intended to analyze which and how much the hypothesized regressors were related to the loan repayment performance of rural smallholder farmers. As already noted, the dependent variable was a dummy variable, which took a value of zero or one, depending on whether or not a borrower defaulted. However, the independent variables were of both types, continuous or categorical.

A choice has to be made between Logit and Probit models to analyse studies involving qualitative choices. According to Amemiya (1981), the statistical similarities between logit and probit models make a choice between them difficult. However, Maddala (1983) and Kmenta (1986) reported that many authors agree that the logistic and cumulative normal functions are very close in the mid-range. However, the logistic function has slightly heavier tails than the cumulative normal functions. Gujarati (1988) illustrated that the logit and probit formulations are comparable. The main difference is that the former has slightly fatter tails; the normal curve approaches the axes more quickly than the logistic curve.

Hosmer and Lemeshew (1989) pointed out that a logistic distribution (logit) has an advantage over the others in the dichotomous outcome variable. It is a highly flexible and easily used model from a mathematical perspective, resulting in a meaningful interpretation. Hence, the logit model is selected for this study.

Assume that there exists a latent (unobserved) variable such that:

$$y_i^* = \beta x_i + \varepsilon_i$$

$$y^* = 1 \text{ if } y_i^* > 0; \quad 0 \text{ if } y_i^* \leq 0$$

Where:

$y_i^*$  = a vector of the latent variable that is not observed for values less than zero and greater than one,

$y^*$  = the observed variable, representing the proportion of loan repayment,

$\beta$  = the unknown parameters that are reflecting the impact of change in variable  $X$ ,

$X_i$  = explanatory variables that determine the dependent variable,

$\varepsilon_i$  = error terms that are distributed normally with mean 0 and variance  $\sigma^2$ ,

$i = 1, 2, 3, \dots, n$ , represents the number of observations.

$$\text{prob} ( Y = 1 ) = \frac{1}{1 + e^{-z_i}}$$

Taking the natural logarithm is:

$$Z_i = \ln\left(\frac{p_i}{1-p_i}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

If the error term ( $\epsilon$ ) is taken into account, the Logit model becomes:

$$Z_i = \alpha + \sum_{i=1}^k \beta_i X_i + \epsilon_i$$

The unknown parameters  $\beta$ 's are estimated by the likelihood function.

The dependent variable loan repayment is socio-economic, loan-specific, business and lender-related factors. The function is specified as:

$$Z_i = LR_i = f(S, Lo, B)$$

Where:

$LR_i$  = loan repayment for the  $i^{th}$  borrower ( $LR_i = 0$ , borrower repaying loan on time;  $LR_i = 1$ , borrower did not repay loan on time)

$f$  = a cumulative density function (CDF)

$S$  = represents the individual client's characteristics that affect the decision whether to repay their loan or not

$Lo$  = stands for the loan-specific characteristics of the individual clients

$B$  = represent the business-specific characteristics of each client.

### 3.4.3. Sensitivity Analysis

The model's parameters are estimated using the iterative maximum likelihood estimation procedure. In reality, the significant explanatory variables do not all have the same impact on the loan repayment performance of rural smallholder farmers. The relative importance of quantitative explanatory variables affecting loan repayment

performance can be measured by examining variable elasticity, defined as the percentage change in probabilities that would result from a percentage change in the value of these variables. To compute the elasticity, one needs to select a variable of interest, calculate the associated  $P_i$ , vary the  $X_i$  of interest by some small amount and re-compute the  $P_i$ . And then measure the rate of change as  $dP_i/dX_i$ , where  $dX_i$  and  $dP_i$  stand for percentage changes in the continuous explanatory variable ( $X_i$ ) and in the associated probability levels ( $P_i$ ) respectively. When  $dX_i$  is very small; this rate of change is simply the derivative of  $P_i$  concerning  $X_i$ . Furthermore, it is expressed as follows (Aldrich and Nelson, 1984):

$$\frac{dP_i}{dX_i} = \frac{e^{Z_i}}{(1 + e^{Z_i})^2} \beta_i = P_i(1 - P_i)\beta_i$$

The impact of each significant qualitative explanatory variable on the probability of defaulting of a typical borrower, who represents the characteristics of the majority of the borrowers, is calculated by keeping the continuous variables at their mean values and the dummy variables at their most frequent values (zero or one).

#### 3.4.4. Parameter Estimation

To fit the logistic regression model, the estimation of the values of the unknown parameters  $\alpha$  and  $\beta_i$ 's are required. The Least Square Estimation (OLS) method estimates the model's parameters in linear regression. In this method, those values of  $\alpha$  (constant) and  $\beta_i$  (coefficients of explanatory variables), which minimizes the sum of squared deviations of the observed values of  $Z_i$  (dependent variable) from the predicted values are determined. Under the assumptions of linear regression, the least squares method yields estimators with several desirable statistical properties. Unfortunately, when the method of OLS is applied to a model with a dichotomous outcome, the estimators no longer have these same properties (Hosmer and Lemshow, 1989; Gujarati, 1988).

Since the method of OLS does not make any assumptions about the probabilistic nature of the disturbance term ( $u_i$ ) in logistic regression, the parameters of the model are estimated using the maximum likelihood (ML) method (Maddala, 1989; Gujarati, 1988). Due to the nonlinearity of the logistic regression model, an iterative algorithm is

necessary for parameter estimation. Maddala (1989) pointed out that ML is a very general method of estimation that applies to a large variety of problems. The ML estimation method suggests choosing estimates as the values of the parameters that maximize the likelihood function (Maddala, 1989). In many cases, it is convenient to maximize the logarithm of the likelihood function rather than the likelihood function itself, and the same results are obtained (Maddala, 1989). Hosmer and Lemeshow (1989) concluded that ML yields values for the unknown parameters in a very general sense, maximising the probability of obtaining the observed data set. Mostly this method is preferred when large sample size is used.

Before taking the selected variables into the logit model, it is necessary to check for multicollinearity among the continuous variables and verify the degree of association among discrete variables. The reason for this is that the existence of multicollinearity will affect the parameter estimates seriously. If multicollinearity turns out to be significant, the simultaneous presence of the two variables will attenuate or reinforce the individual effects of these variables. However, omitting significant interaction terms incorrectly will lead to a specification bias. To put it in a nutshell, the coefficients of the interaction variables indicate whether or not one of the two associated variables should be eliminated from model analysis (Kothari, 1990). Accordingly, a Variance Inflation Factor (VIF ( $X_j$ )) technique was employed to detect the problem of multicollinearity for continuous variables (Gujarati, 1995). Each selected continuous explanatory variable ( $X_j$ ) is regressed on all the other continuous explanatory variables, the coefficients of determination ( $R_j^2$ ) being constructed in each case. If an approximately linear relationship exists among the explanatory variables, then this should show up as a 'large' value for  $R_j^2$  In at least one of the test regressions. A popular measure of multicollinearity associated with the VIF ( $X_j$ ) is defined as:

$$VIF(X_j) = (1 - R_j^2)^{-1}$$

Where,

$R_j^2$ - is the coefficient of multiple determinations when the variable  $X_j$  is regressed on the other explanatory variable. A rise in the value of  $R_j^2$  An increase in the degree of

multicollinearity leads to an increase in the variances and the standard errors of the OLS estimators. Therefore, a VIF value greater than 10 signals strong multicollinearity (Gujarati, 1995).

Similarly, there may also be an interaction between two qualitative variables, leading to a high degree of association between the two variables. To detect this problem, contingency coefficients were computed from the survey data. The contingency coefficients are computed as follows:

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

Where,

$C$  = coefficient of contingency,

$\chi^2$  = Chi-square random variable and

$N$  = total sample size.

### **3.4.5. Testing Hypotheses about the Coefficients**

Separate tests of the null hypothesis that individual coefficients are zero can be computed using the t-test of the multiple linear regression models (Gujarati, 1988). This test can be used to see the statistical significance of each coefficient. An F-test based on the OLS estimation procedure is a comprehensive test of the null hypothesis that all the parameters associated with the explanatory variables in these models are equal to zero.

In logit and other probability models, the most commonly used test is the likelihood ratio statistic, which follows the Chi-square ( $\chi^2$ ) distribution (Liao, 1994). In the ML estimation method, a log-likelihood ratio test replaces the usual F-test of OLS regression models to evaluate the significance of all or a subset of coefficients (Aldrich and Nelson, 1984; Pindyck and Rubinfeld, 1981). The Chi-square tests the null

hypothesis that the coefficients for all terms in the current model except the constant are zero. The log-likelihood ratio statistic follows a Chi-square distribution with k degrees of freedom (where k is the number of parameters in the equations less the constant). It is calculated as the difference between -2 times log-likelihood for the model with only a constant and -2 times log-likelihood for the current model:

$$\chi^2 = -2 (\ln Lo - \ln Lmax)$$

Where,

*Lo* is the value of the likelihood function for the constant only, and *Lmax* is the value of the likelihood function when all or a subset of independent variables are included in the model (Maddala, 1989; Kementa, 1986; Pindyck and Rubinfeld, 1981).

### 3.4.6. Interpretation of Parameter Estimates

In multiple linear regression, the interpretation of the coefficient is straightforward. It tells the amount of change in the dependent variable for a unit change in the independent variable. The interpretation of logistic regression coefficients ( $\beta_i$ ) is considered by using the odds ratio  $[\frac{P_i}{1-P_i}]$  and log of the odds ratio  $[\ln(\frac{P_i}{1-P_i})]$  (Liao, 1994). The odds value gives the expected change in the odds ratio of non-defaulting versus defaulting per unit change in an explanatory variable, other things being equal. The same interpretation applies to dummy and continuous variables (Liao, 1994). The logistic regression slope coefficient can be interpreted as the change in the log odds associated with a unit change in the independent variable ( $X_i$ ), i.e., it tells how the log odds in favour of defaulting change as  $X_i$  Changes by one unit. The  $\alpha$  is log odds in favour of being a defaulter if  $X_i$  is zero.

### 3.5. Financial Performance Measurement

The financial measures were designed to evaluate success over time since they provide a critical management tool for diagnosing weak elements within financial institutions.

Financial ratios such as liquidity, debt, and Profitability ratios were used to measure the financial performance of the institutions (Wales, 2010). Thus indicators selected for financial performance measurement will be financial ratios such as liquidity ratio, debt ratio and return on asset ratio. These are the most significant financial ratios that allow for forming a judgment about the efficiency of the cooperatives, the return on key aggregates (income ratios) and their creditworthiness.

### 3.5.1. Liquidity

Liquidity is the ability to pay short-term debts or adequate cash flow to cover debts and bills, which are in the fast circulating current liabilities of less than one year's repayment period. Liquidity is measured by comparing current assets (liquid funds) to liabilities (short-term debts). Cash and money in the bank are truly liquid funds. These funds can be released immediately in case a creditor requires payment. Debtors and stocks are less liquid forms of property or assets (FAO, 2001; Malone, 2010).

Liquidity measurements are used to judge the short-term stability of a business. In this analysis, we use the current and quick ratios. The current ratio is current assets divided by current liabilities. This provides an insight into how well the cooperative can meet its current obligations. The quick ratio is similar to the current ratio, except inventories are excluded from the current assets. Inventory is usually considered the least liquid of these assets. Thus, excluding them from this analysis may provide a more accurate picture of liquidity.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Money in the current assets of the cooperative is essential to finance daily business activities. The more active money circulates from purchases to sales income, the better the cooperative can operate its business and generate income. Therefore, sufficient working capital is essential for a successful business (FAO, 2001).

A current ratio of 1 suggests that the firm has enough resources to cover its short-term obligations. Traditionally, a current ratio of at least 2 was considered appropriate for most businesses to maintain creditworthiness. However, a current ratio that is too high

should be viewed with suspicion. It may be due to high inventory levels and receivables (which implies poor working capital efficiency) or a high level of cash that could be put to better use than deposits in the bank.

### 3.5.2. Solvency

Solvency is the ability of a cooperative to have enough assets to cover its liabilities. The cooperative's financial strength depends on how its assets (property) are financed, shown by the liabilities. Liabilities are divided into financing by external lenders and financing by members' funds (share capital, reserves and accumulated surplus). Financial strength improves with increased member financing of the cooperative's assets.

$$\text{Solvency in \%} = \frac{\text{Members' funds (Share capital + Reserves + Surplus)}}{\text{Total liabilities (Total financing)}} \times 100$$

The cooperative has a weak capital structure if member financing is less than 40% of the total capital. A weak cooperative cannot improve its share of member financing and is typically financed by short-term capital (creditors and overdraft). If share capital members' funds decrease to less than 15%, the cooperative or any other type of organization is dangerously close to bankruptcy (FAO, 2001). Therefore, equity should grow over time as a primary means of ensuring the cooperative's sustainability. Declining equity per member can be a worrisome sign.

### 3.5.3. Indebtedness

Indebtedness is the opposite of solvency and describes how much of the total capital of the cooperative consists of debt payable to creditors and banks. Indebtedness can be calculated as a percentage ratio.

$$\text{Indebtedness in \%} = \frac{\text{Total liabilities less members' funds}}{\text{Total liabilities (total financing)}} \times 100$$

High indebtedness is a sign of a weak capital structure. For example, suppose external financing is more than 60% of the total financing. In that case, lenders own a more

significant stake in the cooperative assets than members; therefore, the cooperative has a weak capital structure. If external financing increases to 85% of the total financing of assets, the cooperative is dangerously close to bankruptcy (FAO, 2001).

#### **3.5.4. Return on Investment (Asset)**

At an organizational level, the ultimate financial measure of short-term efficiency is the relationship between net profit and capital employed, typically expressed in percentage terms as the rate of return on capital employed or the rate of return on asset (ROA). This ratio shows the return (i.e. net output) that has been generated by the capital employed (i.e. input) during a given period (Wilson and Gilligan, 2005:105).

Profitability ratios show a firm's overall efficiency and performance. We can divide profitability ratios into two types: margins and returns. Ratios that show margins represent the firm's ability to translate sales into profits at various stages of measurement. Ratios that show returns represent the firm's ability to measure its overall efficiency in generating returns for its shareholders (Peavler, 2010).

$$\text{ROA} = \frac{\text{Net profit}}{\text{total asset}} \times 100$$

Based on the above literature, ROA will be selected to see the profitability of sample cooperative societies.

#### **3.6. Working Hypotheses and Definitions of Variables**

Among many factors, which have been related to borrowers' loan repayment performance, in this study, the following demographic, socio-economic, attitudinal and institutional factors are hypothesized to explain loan default situations of rural smallholder farmers in the study area.

**Dependent Variable (LRPB):** This is defined as the loan repayment performance of borrowers, a dummy variable taking a value of one if the borrower is a Non-Defaulter and zero otherwise.

## **Independent Variables**

**Age of the household head (AGE):** It is defined as the number of years the respondent household from birth until the survey was conducted. It is a continuous variable measured by years. Through time household heads acquire experience in the farming business and/or credit use. Moreover, older borrowers may accumulate more wealth than younger ones. Therefore, this variable is hypothesized to impact the loan repayment performance of respondents positively. However, if they have low labour within their households, older households in rural areas are economically disadvantaged in undertaking the heavy physical labour required in agriculture. Each additional unit increase in age after some point would thus add less to household income leading to low credit repayment performance. Therefore, the expected effect of age on loan repayment could be positive or negative.

**Off-farm income (OFRI):** is defined as income (in Birr) generated from activities other than crop and livestock production. These include petty trading, casual work, homemade drinks, handicrafts (weaving, blacksmith, tannery) etc. These additional sources of income would encourage the borrowers to settle their debt even during hard times and when the repayment period coincides with low agricultural prices. During this time, farmers who practice off-farm activities can quickly repay their loans on time than those who do not involve in off-farm income. Therefore, as a variable, off-farm income is hypothesized to impact loan repayment positively. Bhatt and Tang (2002)

**Loan diversion (LNDV):** Sometimes, borrowers use production credit for consumption smoothing purposes since credit, by its nature, is fungible and may not be used for intended purposes. Therefore, defaulters tend to divert production credit into consumption more than the non-defaulters group. Therefore, loan diversion is expected to increase the rate of default. This variable takes a value of one loan diverted and zero otherwise.

**Experience in formal credit use (CREDTEXP):** The number of years respondents borrow from formal credit institutions. Farmers with experience in formal credit use develop reputation and creditworthiness and become trustworthy clients of banks. Therefore, they would likely pay their debt on the due date than inexperienced farmers. Bhatt and Tang (2002)

**Farm size (FRSZ)** in hectares refers to the total cultivated landholding of the household. It is argued that farmers with large farms have a better chance of earning more income which in turn enables him/ her to use inputs and repay credits. Therefore, this variable is hypothesized to impact credit repayment positively.

**Family size (FAMSIZE):** The number of family members residing with the respondent. The larger the family members, the more the labour force available for production. Therefore, more alternative income sources can be possible to overcome credit risks. Based on this, families with a sufficient labour force would be expected to have a low probability of default. On the contrary, since food requirements increase with the number of adult equivalents in the family, most produce is used for consumption as family members increase. Therefore, family size is expected to decrease farmers' loan repayment performance. Therefore, the coefficient of this variable may appear with a negative or positive effect on the credit repayment performance of the household.

**Education level (EDULEVEL):** the number of years of schooling attained by the respondents up to the survey time. It takes values 0, 1, 2, 3 and 4 for illiterate, read and write, 1-8 grades, 9-12 grades, and above 12. Education may enable farmers to be more aware of the importance of formal loans and reduce willful default. In addition, educated farmers are expected to have more exposure to the external environment, to be acquainted with agricultural technologies, manuals, and accumulated knowledge through training. Therefore, educated farmers would be expected to settle their loan timely than illiterate farmers. Bhatt and Tang (2002).

**Number of Livestock Owned (LIVSTNO):** This variable is defined in Tropical Livestock Unit (TLU). The higher total household wealth in livestock would increase farmers' repayment capacity since livestock can be easily liquidated into money. Farmers who own more livestock can repay their loans even when their crops fail due to natural disasters. In addition, as a proxy to oxen ownership, farmers who have a more significant number of livestock have sufficient oxen to plough their field time and obtain high yields and income to repay loans. Therefore, the higher the number of livestock owned, the more the probability of being a non-defaulter and vice versa. (Brehanu and Fufa, 2008)

**Health Status of the Household (HEALTST):** the sickness of family members increases investment in consumption and credit needs from the informal financial sector to finance medicaments and health care. Therefore, health-related expenses negatively affect the formal credit repayment performance of smallholders.

**Celebration of social ceremonies (CRMN):** These ceremonies are celebrated occasionally, such as weddings, burials (funerals) and others. The expenses for these ceremonies are sometimes too large relative to borrowers' economic status. If a person has celebrated one or more of these, CRMN takes a value of one but zero otherwise. As this variable can be a proxy for the use of income for non-productive purposes, it is expected to have a negative impact on loan repayment performance.

**Amount of other credit borrowed (AMTOCB):** the credit borrowed from different formal or informal sources. Suppose an individual borrowed from a different source that should be paid within a similar period discourages the repayment performance. Thus, it is hypothesized to negatively impact borrowers who have borrowed from other informal sources would be expected to not repay on time than those with small loans.

**Business Development Services (BDS):** are non-financial services provided to businesses for efficient operation and growth. It includes market access services, training and technical assistance, and infrastructure-related services during regular follow-up. This dummy variable takes a value of 1 if the household receives business development service and 0 otherwise. The variable represents business development service as a source of information and technical assistance influences farm households' technology adoption decisions. Therefore, it is hypothesized that this variable positively influences credit repayment.

**Type of loan (TYPLOAN):** The nature of the loan, either cash or in-kind (seeds, fertilizer and equipment), can influence the borrowers' repayment behaviour. Most of the time, borrowers who received a loan in kind had higher repayment rates than borrowers who received a cash loan. Many borrowers misused the cash, diverting it into personal consumption instead of investing in making their business productive. Therefore, the provision of kind loans positively affects smallholder farmers' formal credit repayment performance.

**Timing of loan disbursements (TIMLDISB):** it is the season in which the loan is disbursed. If the loan is disbursed in appropriate time to perform the desired activity, productivity and profitability will be high and reversed. In addition, if there are social events that the community may celebrate during loan disbursement, the borrowers will divert the loan to celebrate social ceremonies and face loan repayment difficulties. Therefore, the loan provision at an appropriate time positively affects smallholder farmers' formal credit repayment performance.

**Borrowers' attitude towards borrowed resource (BORATTAR):** The borrower's characteristics towards the borrowed resource. Some borrowers voluntarily default due to morally hazardous behaviour. In this category, the borrower can repay the borrowed funds but refuses to because of the institution's low level of enforcement mechanisms (Brehanu and Fufa, 2008).

**Table 2: Summary of Explanatory Variables and their Expected Effect**

S. No.	Independent variables	Variable Type	Expected effect
1	Age of the borrower (AGEB)	Continuous	Positive/Negative
2	Off-farm income (OFRI)	Continuous	Positive
3	Loan diversion (LNDV):	Dummy	Negative
4	Experience in formal credit use (CREDTEXP)	Continuous	Positive
5	Farm size (FRSZ)	Continuous	Positive
6	Family size (FAMLYSIZE)	Continuous	Positive/Negative
7	Education level (EDULEVEL)	Dummy	Positive
8	Total livestock ownership (TLU)	Continuous	Positive
9	Health condition (HEALTHEX)	Dummy	Negative
10	Amount of other credit borrowed (AMTOCB)	Continuous	Negative
11	Celebration of social ceremonies (CRMN)	Dummy	Negative
12	Business development service (BDS) (training and follow-up/ supervision)	Dummy	Positive
13	Type of loan (TYPLOAN)	Dummy	Negative
14	Timing of loan disbursements (TIMLDISB)	Dummy	Negative
15	Borrowers' attitude towards borrowed resource (BORATTAR)	Dummy	Negative

# CHAPTER IV

## 4. DATA ANALYSIS AND RESULTS

## 4. DATA ANALYSIS AND RESULTS

This chapter presents the financial and loan recovery performance of agricultural credit lending institutions in the study area and the results from descriptive and econometric analyses of factors affecting smallholder farmers' agricultural loan repayment performance. The descriptive analysis uses tools such as mean, percentages and standard deviation. In addition, the t-test and chi-square statistics were employed to compare the defaulters and non-defaulters groups concerning some explanatory variables. Econometric analysis was carried out to identify the most critical factors affecting loan repayment performance and measure the relative importance of significant explanatory variables on loan repayment performance.

### 4.1. Financial performance measurement

Any intermediary financial institution has three essential objectives. These are maximizing profit, minimizing risk and minimizing cost. These three objectives are interrelated because profit is constrained by risk and costs.

Profit maximizing has a logical limit because risk increases as an opportunity for profit increases. At a certain point, financial institutions may increase profit because risk becomes too high and threatens further growth or sustainability.

Cost minimizing has also a logical limit because as costs are lowered, risk also increases. Again, the ability to minimize risk relies on financial institutions' income. At a certain point, financial institutions may not be able to lower costs because risk may become too high and threaten growth and/or sustainability.

To have the most rational discussion of these three objectives, this paper will present them in a different order. First, it will cover risk; second, it will cover profit while treating cost as an aspect of profit. For each topic, some mathematical tools were presented for measuring and monitoring. Finally, some introductory ratios will be presented to manage the three simultaneously.

One of the influencing factors affecting the financial performance of agricultural credit-providing institutions in the study area is default risk. Default risk is the risk that borrowers will not repay or have behaviours that increase their chances of repayment. If borrowers default, then savers may not be repaid. If any savers are not repaid, they will lose confidence in the cooperatives, and everyone will rush to withdraw their savings. In effect, the financial institution will lose its reputation and become bankrupt.

The financial measures were designed to evaluate success over time since they provide a critical management tool for diagnosing weak elements within financial institutions. Therefore, financial ratios such as liquidity, debt, and Profitability ratios were used to measure the financial performance of the cooperatives (Wales, 2010).

Thus indicators selected for financial performance measurement will be financial ratios such as liquidity ratio, debt ratio and return on asset ratio. These are the most significant financial ratios that allow for forming a judgment about the efficiency of the financial institutions, the return on key aggregates (income ratios) and their creditworthiness.

#### **4.1.1. Liquidity**

Liquidity is the ability to pay short-term debts or adequate cash flow to cover debts and bills, which are in the fast circulating current liabilities of less than one year's repayment period. Liquidity is measured by comparing current assets (liquid funds) to liabilities (short-term debts). Cash and money in the bank are truly liquid funds. These funds can be released immediately in case a creditor requires payment. Debtors and stocks are less liquid forms of property or assets (FAO, 2001; Malone, 2010).

Liquidity measurements are used to judge the short-term stability of a business. In this analysis, we use the current and quick ratios. The current ratio is current assets divided by current liabilities. This provides an insight into how well the cooperative can meet its current obligations. The quick ratio is similar to the current ratio, except inventories are excluded from the current assets. Inventory is usually considered the least liquid of these assets. Thus, excluding them from this analysis may provide a more accurate picture of liquidity.

**Table 3: Current ratio of agricultural credit providing institution of the study area**

<b>S. No.</b>	<b>Name of Agricultural Credit providing Institution</b>	<b>Liquidity of the Institutions</b>	<b>Current Ratio</b>
1	Omo Microfinance Institution	14,428,875.5/7,618,574.53	1.89
2	Rural Saving and Credit Cooperatives	19281/13070	1.47
3	Wisdom Microfinance	12,126,671.61/4,069,034.59	2.98
4	Multi-Purpose Cooperative	693,679.48/699,868.22	0.99

Source: own computation, 2013 and Institutions' Audit Report of the year 2012

Money in the current assets of the financial institution is essential to finance daily business activities. The more active money circulates from purchases to sales income, the better the ability of the MFI to operate its business and generate income. The provision of sufficient working capital is essential for a successful business (FAO, 2001).

The current ratio of Omo Microfinance, Rural Saving and Credit Cooperative, Wisdom Microfinance and Multi-Purpose Cooperative is 1.89, 1.47, 2.98 and 0.99. (Table 3). This implies that, except for Multi-Purpose Cooperatives, all the agricultural lending institutions have enough resources to cover their short-term obligations. However, this also indicates that MPC has higher arrears and less liquid forms of property or assets.

#### **4.1.2. Solvency**

Solvency is the ability of a cooperative to have enough assets to cover its liabilities. The financial strength of the MFI depends on how its assets (property) are financed, shown by the liabilities. Liabilities are divided into financing by external lenders and financing by members' funds (share capital, reserves and accumulated surplus). Financial strength improves with increased member financing of the cooperative's assets.

**Table 4: Solvency in % of Agricultural Lending Institutions of the study area**

<b>S. No.</b>	<b>Name of Agricultural Credit providing Institution</b>	<b>Solvency of the Institutions</b>	<b>Solvency in %</b>
1	Omo Microfinance Institution	7,618574.53/6,838,848.6*100	89.76
2	Rural Saving and Credit Cooperatives	14,270/13,070*100	109.18
3	Wisdom Microfinance	7,172,823.05/5,881,282.01*100	121.96
4	Multi-Purpose Cooperative	122,654.26/699,868.22*100	17.52

Source: Institutions Audit report of the year 2012

This implies that, except for Multi-Purpose Cooperatives, all the agricultural lending institutions have enough resources to cover their short-term obligations. However, this also indicates that MPC has higher arrears and less liquid forms of property or assets.

The member financing of Omo Microfinance, Rural Saving and Credit Cooperative, Wisdom Microfinance and Multi-Purpose Cooperative is 89.76%, 109.18%, 121.96% and 17.52%. (Table 4). As a result, the members' financing of Multi-Purpose Cooperative is less than 40% of the total capital, only 17.52%. It implies that MPC has a weak capital structure. A weak cooperative cannot improve its share of member financing and is typically financed by short-term capital (creditors and overdraft). If share capital members' funds decrease to less than 15%, the cooperative or any other type of organization is dangerously close to bankruptcy (FAO, 2001). Equity should be growing over time as a primary means of ensuring the cooperative's sustainability. Declining equity per member can be a worrisome sign.

#### **4.1.3. Indebtedness**

Indebtedness is the opposite of solvency and describes how much of the total capital of the MFI consists of debt payable to creditors and banks. Indebtedness can be calculated as a percentage ratio.

**Table 5: Indebtedness of Agricultural Lending Institutions in the study area**

<b>S. No.</b>	<b>Name of Agricultural Credit providing Institution</b>	<b>Indebtedness of the Institutions</b>	<b>Indebtedness in %</b>
1	Omo Microfinance Institution	$6,740,517/7,618,574.53*100$	88.47
2	Rural Saving and Credit Cooperatives	$0/13070*100$	0
3	Wisdom Microfinance	$2,035,749.57/5,881,282.01*100$	34.61
4	Multi-Purpose Cooperative	$699,868.22/699,868.22*100$	100

Source: Institutions Audit report of the year 2012

The indebtedness of Omo Microfinance, Rural Saving and Credit Cooperative, Wisdom Microfinance and Multi-Purpose Cooperative is 88.47%, 0%, 34.61% and 100%. (Table 5). As a result, the total capital of MPC is based on external financing, which implies that high indebtedness is a sign of a weak capital structure. Suppose external financing is more than 60% of the total financing. In that case, lenders own a more significant stake in the cooperative assets than members; therefore, the cooperative has a weak capital structure. If external financing increases to 85% of the total financing of assets, the cooperative is dangerously close to bankruptcy (FAO, 2001).

#### **4.1.4. Return on investment (asset)**

Return on investment or profitability ratios show a firm's overall efficiency and performance. Profitability ratios can divide into two types: margins and returns. Ratios that show margins represent the firm's ability to translate sales into profits at various stages of measurement. Ratios that show returns represent the firm's ability to measure its overall efficiency in generating returns for its shareholders (Peavler, 2010).

**Table 6: Return on investment of agricultural credit providing institutions**

S. No.	Name of Agricultural Credit providing Institution	ROA of the lending Institutions	ROA in %
1	Omo Microfinance Institution	315,070.48/14,457,423.13*100	2.18
2	Rural Saving and Credit Cooperatives	1,776/27,340*100	6.50
3	Wisdom Microfinance	1,015,714.21/13,054,105.06*100	7.78
4	Multi-Purpose Cooperative	(-19,744.84/822,522.48)*100	(-2.40)

Source: Audit report of Agricultural Credit providing Institutions of the study area, 2012

The percentage return on investment of Omo Microfinance, Rural Saving and Credit Cooperative, Wisdom Microfinance and Multi-Purpose Cooperative is 2.18%, 6.50%, 7.78% and -2.40% (Table 6). This result shows a higher return on assets employed by Wisdom microfinance institution, which is 7.78% than the other agriculture credit providing institutions of the given area on given time and the loss or negative return on employed investment– 2.40% Multi-Purpose Cooperative. This implies that the agricultural lending institutions' overall efficiency and performance, which means the lending institution with a high return on investment, has better overall efficiency and performance, especially in credit risk management.

#### 4.1.5. Loan Recovery Performance

**Table 7: Loan Recovery Performance of Agricultural Lending Institutions**

S. No.	Credit Service Provider	Amount Disbursed	Amount Collected	Recovery Rate in %
1	OMF	552,181,654.42	364,968,584.88	66
2	WMF	10,766,068.00	10,329,875.00	96
3	MPC	204,427,872.94	3,082,962.94	1.51
4	RSACCs	31,324,900.00	7,911,305.00	25.26

Source: The institutions' annual report of 2012

The most typical challenge faced by any microfinance institution is credit risk. Moreover, the cost of debt collection per loan amount is, on average, higher than informal intermediation, especially in developing countries. Loan recovery is essential for all financial institutions involved in lending money. Concerning loan recovery status, agricultural lending institutions in the study area have different statuses; however, they borrowed from smallholder farmers in similar socioeconomic and macro-economic conditions. As we have seen from the above table, agricultural credit lending institutions in the study area have different loan recovery performances that are 66%, 96%, 1.51% and 25.26% OMF, WMF, MPC, and RSACC, respectively. (Table 7). This implies that, among other agricultural credit lending institutions operating in the study area, only WMF institutions meet the internationally accepted level of loan recovery performance above 90%. The rest perform to the international standard. Therefore, the percentage difference between agricultural lending institutions' loan recovery performance is the difference in lending procedures and strategies to reduce late payments and some internal and external challenges that lending institutions face. Click here (<https://www.youtube.com/watch?v=oZ8xTAYLNrY>)

### **Strategies in place to ensure repayment and reduce default by WMF and OMF institutions but not in cooperatives**

- There are well-designed client selection mechanisms that screen out applicants lacking repayment capacity and/or willingness to make repayments. So that. OMF and WMF institutions; know their customers in a better way than cooperatives.
- The institutional capacity is matched with repayment capacity and plans as closely as possible to avoid repayment complications.
- It is accepted in MFIs that default problems generally do not occur because of bad clients but flawed lending methods.
- There are established reporting system which allows for timely monitoring and follow-up action by loan officers.

- An established reporting system gives up-to-date information about portfolio quality, trends, and possible default risk factors.
- An ethos instilled in MFI institutions; makes late payments unacceptable.
- There is an established incentive system for on-time repayments. The benefits of paying punctually should exceed the benefits of late repayment. In WMF institutions, incentives are established for even loan officers based on their delinquency management performance.
- MFIs set maximum levels for late payments and defaults as benchmarks for the institutions. These levels should be based on a detailed analysis of the costs of late payments and defaults.

In addition to this strategic difference in place, cooperatives have many internal and external challenges, such as

#### **Internal Challenges:**

- Shortage of loanable funds for further expansion and to meet clients' demands,
- High turnover of employees to other organizations is mainly attracted by better salary scales and benefits provided by other organizations.
- All activities in the institution are done manually/do not use a computerized system
- Insufficient working place/office in most service delivery posts, staff of the institution share one office with the employees of other government organizations,
- Poor documentation
- Limited financial capacity of the institutions and insufficient employees, especially loan officers. Moreover, they could not consider the customer complaints and did not take corrective action.

## **External Challenges:**

- Competition- there is robust competition faced by MFIs in mobilising savings and increasing loan size. Government trust the capacity of MFIs, especially Omo microfinance institution. Moreover, the other sources of competition are NGOs, Global funds and other institutions that give loans without interest. Due to this challenge, activities like agricultural input distribution for smallholder farmers; previously managed through MPC and different funds like; global funds, Productive Safety Net Program, HAB program and other NGOs resources provided for poor rural farmers as a different package and revolving through rural saving and credit cooperatives is currently shifted to OMF institution. This may hurt the profitability and sustainability of cooperatives, even if its benefit is crucial for rural resource-poor farmers.
- Improper interference of the third party in the decision of loan approval. Norell (2001) also reported that the default rate might increase if the loan is given without the proper evaluation of the business. Instead of improper interference, the government should take strong and meaningful measures to ensure appropriate repayment facilities and provide all agricultural credit lending institutions assistance to recover loans.

## **4.2. Descriptive Analysis**

The demographic, socio-economic and institutional characteristics of the respondents such as age, sex, marital status, family size, level of education, cultivated land, number of livestock owned, health condition of the household, fertility status of the soil and other variables related to timely credit repayment (defaulters and non-defaulters) were analyzed by using descriptive statistics.

### **4.2.1. Demographic characteristics**

#### **Age of the household head**

The sample respondents ranged from 24 to 66 years, with a mean of 46.81 years and a standard deviation of 11.18. The average age of non-defaulters was 51.93 years, while

that of defaulters was 43.39 years. Therefore, the survey result shows that the mean difference between non-defaulters and defaulters regarding age was statistically significant at a 1% level (Table 8). This indicates that non-defaulters are more aged than defaulters, implying that household heads acquire experience in the farming business and/or credit use over time. Moreover, older borrowers may accumulate more wealth than younger ones.

**Table 8: Distribution of the Sample households by Age**

Characteristics	Non Defaulters (N=56)		Defaulters (N=84)		T- value	Total sample (N=140)	
	Mean	Std. Dev.	Mean	Std.Dev.		Mean	Std. Dev.
Age (years)	51.93	7.78	43.39	11.82	4.757***	46.81	11.18
Maximum		66		65			66
Minimum		36		24			24

\*\*\* Significant at 1% probability level;

Source: own computation, 2013;

N = Number of respondents;

### **Family Size of respondents**

The family size of the sample respondents ranged from 2 up to 12 persons, with an average family size of 6.56 and a standard deviation of 2.16. The average family size in the sample was higher than the average family size of the region's 5.5 persons (CSA, 2008). The average family size of the non-defaulters and defaulters was 6.07 and 6.88, with standard deviations of 1.84 and 2.3, respectively. Therefore, the family size between the two groups was statistically significant at 5% (Table 9). This implies that food requirements increase with the number of adult equivalents in the family; most produce is used for consumption as the number of family members increases. Therefore, family size is expected to decrease farmers' loan repayment performance.

The average number of the active labour force (man-equivalent) for the whole sample, non-defaulters and defaulters, was 3.22, 3.42 and 2.93, respectively. This also shows

that the difference between non-defaulters and defaulters regarding active labour was not statistically significant. Compared with the average family size (6.56), 49% of the family members actively engage in economic activity. This shows that almost equal labour forces are involved in production in defaulter and non-defaulter households. Therefore, the family size of the household has both negative and positive effects on repayment performance.

**Table 9: Characteristics of the sample households by family size**

Repayment performance of the borrower			N	Mean	Std. Dev.	T-test	Total Sample (N=140)	
							Mean	Std. Dev.
Family size of Household (number)	Non-defaulter		56	6.07	1.847	2.19**	6.56	2.163
	Defaulter		84	6.88	2.305			
Economically dependent family size (number)	Non-defaulter		56	3.12	1.336	1.33	3.34	1.530
	Defaulter		84	3.48	1.639			
Economically active family size (number)	Non-defaulter		56	2.93	1.524	1.84	3.22	1.550
	Defaulter		84	3.42	1.546			

Source: Own survey results, 2013; \*\* Significant at 5% probability level, Note: Active labour is an age group lying between 15 to 64 years.

N = Number of respondent

### Experience in formal Credit Use

The credit use experience of the sample respondents ranged from 1 to 10 years, with a mean of 5.78 years and a standard deviation of 2.97. The average year of formal credit use experience of non-defaulters was 5.75 years, while that of defaulters was 5.80 years. Therefore, the survey result shows that the mean difference between non-defaulters and defaulters concerning age was statistically insignificant. (Table 10)

**Table 10: Distribution of sample respondents by the experience of formal credit**

Characteristics	Non-defaulters (N=56)		Defaulters (N=84)		T-value 0.093	Total sample (N=140)	
	Mean	Std.Dev	Mean	Std.Dev.		Mean	Std.Dev.
Credit use Experience	5.75	3.01	5.80	0.97		5.78	2.97
Maximum		10		10			10
Minimum		1		1			1

**use**

Source: own computation, 2013; N = Number of respondents

### Education level

Regarding the educational level, from the total sample of respondents, 32.9%, 30%, 25.7%, 8.6% and 2.9% were illiterate, read and write, 1 to 8 grade, 9 to 12 grade, and 12<sup>th</sup> grade above, respectively. On the other hand, the education level of non-defaulters were 17.9%, 39.9%, 32.1%, 10.7%, and 5.4% were illiterate, read and write, 1 to 8 grade, 9 to 12 grade, and 12<sup>th</sup> grade above respectively while for the defaulters it is 42.9%, 27.4%, 21.4%, 7.1% and 1.2% in the same order. Therefore, the percentage difference between the two groups was statistically significant at 5% (Table 11). This implies that educated farmers have more exposure to the external environment, be acquainted with agricultural technologies and manuals, and accumulate knowledge through training. Therefore, educated farmers can increase production and productivity and settle their loans more timely than illiterate farmers. Bhatt and Tang (2002).

**Table 11: Distribution of sample household heads by educational level**

Variables	Non-defaulters (N=56)		Defaulters (N=84)		$\chi^2$ -Value	Total (N=140)	
	N	%	N	%		N	%
Education level							
Illiterate	10	17.9	36	42.9	10.913**	46	32.9
Read and Write	19	39.9	23	27.4		42	30
1 to 8 grade	18	32.1	18	21.4		36	25.7
9 to 12 grade	6	10.7	6	7.1		12	8.6

Source: own computation, 2013; \*\* Significant at 5% probability level,

N = Number of respondents

## 4.2.2. Socio-economic characteristics of the household

### Farm size

The cultivated farm size (owned and rented) of sample households varies between 0.1 to 2.00 hectares, with an average holding of 0.69 hectares and a standard deviation of 0.54. The average size of the cultivated farm for non-defaulters was 1.1, with a standard deviation of 0.52, while that of defaulters was 0.42, with a standard deviation of 0.34. Statistically, there was a significant difference between non-defaulters and defaulters at 1% related to the size of cultivated land (Table 12). This indicates that non-defaulters hold more cultivable land than defaulters implying that farmers with large farms have a better chance of earning more income which in turn enables him/her to repay credits on the due date.

**Table 12: Landholding differentials between sample farmers**

Characteristics	Non-defaulters (N=56)		Defaulters (N=84)		T- value	Total sample (N=140)	
	Mean	Std.Dev	Mean	Std.Dev		Mean	Std.Dev.
Cultivated land size (ha)	1.1	0.52	0.42	0.34	9.33***	0.69	0.54
Maximum		2.00		1.5			2.00
Minimum		0.2		0.1			0.1

Source: own computation, 2013; \*\*\* Significant at 1% probability level,

N = number of respondents

### Livestock holding

Farmers in the study area undertake both crop and livestock production activities. Though the holding size varied among the sample households and between non-defaulters and defaulters, all sampled respondents owned livestock. The most commonly reared livestock in the study area is cattle, sheep, goats and poultry. The minimum and maximum livestock numbers in TLU maintained by the sample

respondents were 0.72 and 13.72, respectively. It was found that non-defaulters had, on average, 1.27 TLU, while defaulters had 0.92 TLU with a standard deviation of 0.7 and 0.66, respectively.

Moreover, the mean difference between the two groups was statistically significant at 5 per cent (Table 13). This implies that possessing much livestock was a proxy for bearing risks in using credit. Within the type of livestock possessed by households in the study area, the mean differences between defaulters and non-defaulters were found to be statistically significant for 5% and 10% by the ownership of cattle and goats, respectively. On the other hand, the mean difference between defaulters and non-defaulters for poultry and sheep was statistically insignificant.

**Table 13: Distribution of sample households by livestock holding**

Types of livestock	Non-defaulters (N=56)		Defaulters (N=84)		T- value	Total sample (N=140)	
	Mean	Std.Dev	Mean	Std.Dev		Mean	Std.Dev
TLU	1.27	0.70	0.92	0.66	2.38 **	3.43	1.88
Cattle	4.72	2.57	3.45	2.33	3.55**	5.66	3.07
Sheep	0.14	0.10	0.10	0.13	1.69	1.31	1.21
Goat	0.16	0.11	0.09	0.15	2.73*	1.31	1.36
Chicken	0.06	0.02	0.05	0.02	1.55	5.44	1.87

Source: Survey results, 2013; \*\* and \* Significant at 5% and 10% probability level; N = Number of respondents

### **On-farm and off-farm income of the respondents**

The sale of crops, livestock, and animal products is a significant source of income for the sampled households. The average income earned from crops and livestock in 2012 was Birr 4808.98. On average, non-defaulters obtained Birr 5868.17, while defaulters obtained Birr 4102.85. The mean difference between defaulters and non-defaulters

concerning farm income was statistically significant at less than a 1 per cent probability level (Table 14). This implies that the higher the on-farm income the household generated, the greater the repayment capacity of the farmers and the higher the probability of being a non-defaulter. The major non-farm income-generating activities practised in the study area were daily labourers and petty trading. The income generated from off-land activities varies from household to household, with minimum and maximum Birr 400 and 8,900, respectively. Non-defaulters earned, on average, Birr 4115.66, whereas defaulters earned Birr 2436.56. The mean difference between defaulters and non-defaulters in the income generated from off-farm activities was statistically significant at 1% (Table 14). This indicates that non-defaulters generate more annual income than defaulters, implying that farmers earning more income can repay due dates.

**Table 14: Distribution of respondents by On-farm and Non-farm activities**

Variables	Non-defaulters (N=56)		Defaulters (N=84)		T- value	Total sample (N=140)	
	Mean	Std.Dev	Mean	Std.Dev		Mean	Std.Dev
On-farm income (Birr)	5,868.17	2,558.28	4,102.85	1,784.27	4.81***	4,808.98	2,289.97
Non-farm income (Birr)	4,115.66	1,818.84	2,436.56	1,684.31	4.06***	3,389.56	1,940.15

Source: own computation; \*\*\* significant at 1% level; 2013; N = Number of respondents

### **Loan diversion status of the borrower**

Of the sample respondents about loan diversion status, 57.9% spent the loan for intended business activities, and 42.1% diverted the production credit to non-productive purposes. Of non-defaulter sample respondents, 89.3% have spent the credit for intended productive business activities, and 10.7% diverted the loan for other than production purposes. In comparison, 36.9% and 63.1% of the defaulters spent on intended productive activities and diverted to non-productive purposes. Therefore, the percentage difference between the two groups was statistically significant at 1% (Table

15). This shows that defaulters tend to divert production credit into consumption more than the non-defaulters group. Therefore, loan diversion increases the rate of default.

**Table 15: Distribution of sample borrowers by loan diversion status**

Variables	Non-defaulters (N=56)		Defaulters (N=84)		$\chi^2$ – Value	Total sample (N=140)	
	N	%	N	%		N	%
Loan diversion status							
Spent for the intended business	50	89.3	31	36.9	37.81***	81	57.9
Not spent for the intended business	6	10.7	53	63.1		59	42.1

Source: own computation, 2013; \*\*\* Represents significant at 1% level,

N = Number of respondents

### Amount of other Credit borrowed

Other credits borrowed from sample households vary between birr 600 to 8000, with an average of 3123.07 birrs and a standard deviation of 1902.13. The average amount of loan borrowed from another source than a formal source for non-defaulters was 2593.84 with a standard deviation of 1520.68, while that of defaulters was 3299.48 with a standard deviation of 1999.47. Statistically, there was no significant difference between non-defaulters and defaulters related to the amount of credit borrowed from another source (Table 16).

**Table 16: Amount of other Credit borrowed differentials between Sample farmers**

Characteristics	Non-defaulters (N=56)		Defaulters (N=84)		T-value	Total sample (N=140)	
	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.
Amount of other credit borrowed	2593.84	1520.68	3299.48	1999.47	1.16	3123.07	1902.48
Maximum	5620		8000			8000	
Minimum	600		600			600	

Source: own computation, 2013; N = Number of respondents

## Health Status of the Family member

Concerning family member health status, from the total sample of respondents, 75% of all family members were in good health condition in 2012, and 25% of at least one family member was seriously ill in 2012. Of the non-defaulter sample respondents, 91.07% of all the family members were in good health, and 8.93% were seriously ill. In comparison, 64.28% and 35.72% of the defaulters were in good health, and at least one family member was seriously ill in 2012 respectively. Therefore, the percentage difference between the two groups was statistically significant at 1% (Table 17). This implies that the sickness of family members increases investment in consumption and credit needs from the informal financial sector to finance medicaments and health care. Therefore, health-related expenses have a negative effect on the formal credit repayment performance of smallholders

**Table 17: Distribution of sample borrowers by family member's health status**

Variables	Non-defaulters (N=56)		Defaulters (N=84)		χ <sup>2</sup> – Value	Total sample (N=140)	
	N	%	N	%		N	%
	Health status of the family member						
Seriously ill	5	8.93	30	35.72	12.85***	35	25
In good condition	51	91.07	54	64.28		105	75

Source: own computation, 2013; \*\*\* Represents significant at 1% level,  
N = Number of respondents

## Celebration of Social Ceremonies of the Household

Regarding the celebration of the social ceremony, from the total sample of respondents, 18.6% did not celebrate any social ceremonies in 2012, and 81.4% celebrated at least one occasional social ceremony like a wedding, funeral, and others. Of non-defaulter sample respondents, 28.6% did not celebrate occasional social ceremonies, and 71.4% celebrated at least one occasional social ceremony. In comparison, 11.9% and 88.1% of the defaulters

have not celebrated any social ceremonies or at least one occasional social ceremony, respectively. Therefore, the percentage difference between the two groups was statically significant at 1% (Table 18). This implies that the expenses for these ceremonies are sometimes too large relative to borrowers' economic status. As a result, they use income from on/off-farm for non-productive purposes and even borrow other credit to celebrate social ceremonies from informal sources, prioritise paying loans from informal sources and become unable to pay formal credit to formal sources on the due date.

**Table 18: Distribution of sample borrowers by celebration of social ceremonies**

Variables	Non-defaulters (N=56)		Defaulters (N=84)		$\chi^2$ – Value	Total sample (N=140)	
	N	%	N	%		N	%
Celebration of social ceremonies of the household							
Not celebrate any social ceremonies	16	28.6	10	11.9	6.172***	26	18.6
Celebrate one or more social ceremonies	40	71.4	74	88.1		114	81.4

Source: own computation, 2013; \*\*\* Represents significant at 1% level

N = Number of respondents

### 4.2.3. Institutional Factors Affecting Loan Repayment Performance

#### Business Development Service

Business development is a non-financial service for efficient operation and growth. It includes market information, market linkages, training and technical assistance, technology and product development services, etc. Concerning business development services provided for clients, from the total sample respondents, 47.86%, 51.43%, 60.71 and 20.71% received training services related to their business, close follow-up and technical assistance from their loan officer regularly served reasonably throughout the year and market information from their loan officer respectively. On the other hand, from non-defaulter sample respondents, 98.28%, 50%, 89.29%, and 25% received training services related to their business, close follow-up, and regular technical assistance from their loan officer. As a result, they served well throughout the year by lending institutions

and access to market information and linkage through their loan officer, respectively. At the same time, the defaulters were 14.29%, 52.38%, 41.67% and 17.86%, in the same order. Therefore, the percentage difference between the two groups with getting relevant training and market information was statistically significant at 1% and 10%, respectively, and technical assistance and service were not statistically significant (Table 19). This implies that providing relevant market information and training related to their business is a source of information that influences farm households' technology adoption decisions. So that they were enabled to get better income from their business and pay back the loan on time; this implies that the provision of relevant business development services improves the production and profitability of the business venture that the borrowers engaged in, increases the income, and reduces default risk.

**Table 19: Distribution of sample borrowers by business development service provided**

Variables	Non-defaulters (N=56)				Defaulters (N=84)				X <sup>2</sup> - Value	Total sample (N=140)			
	Yes		No		Yes		No			Yes		No	
	N	%	N	%	N	%	N	%		N	%	N	%
Did you get related training to your business?	55	98.28	1	1.78	12	14.29	72	85.71	94.84***	67	47.86	73	52.14
Did the loan officer regularly visit your business/farm?	28	50	28	50	44	52.38	40	47.62	0.076	72	51.43	68	48.57
Are you served in a good manner?	50	89.29	6	10.71	35	41.67	49	58.33	31.94	85	60.71	55	39.29
Did you access market information related to your business from your lending institution?	14	25	0	0	15	17.86	5	5.95	4.103*	29	20.71	5	3.57

Source: own computation, 2013; \*\*\* and \* Represents significant at the level 1% and 10% respectively; N = Number of respondents

### Loan transfer modality either in Cash or in Kind

Concerning loan provision modality either in cash or in-kind, from the total sample respondents, 30.71% agreed that cash transfer of the credit leads to high default, and 69.29% responded that it is not transferred modality whether in cash or kind but other factors that lead to default. Of the non-defaulter sample respondents, 30.36% agreed that some borrowers default due to transfer modality in cash instead of in kind, and 69.64% responded that transfer modality, whether in cash or kind, does not determine repayment performance. In comparison, for the defaulters, it is 30.95% and 69.05%. The transfer modality was agreed on, whether in cash or kind, as a determinant factor for loan repayment and not agreed with the transfer modality, whether in cash/ kind as a determinant factor for loan repayment. Therefore, the percentage difference between the two groups with the transfer of credit transfer modality, either in cash or in kind, was not statically significant (Table 20).

**Table 20: Distribution of sample borrowers by borrowing modality, either in cash or in kind**

Variables	Non-defaulters (N=56)				Defaulters (N=84)				X <sup>2</sup> -Value	Total sample (N=140)			
	Yes		No		Yes		No			Yes		No	
	N	%	N	%	N	%	N	%		N	%	N	%
Type of loan provided in cash	17	30.36	39	69.64	26	30.95	58	69.05	0.006	43	30.71	97	69.29

Source: own computation, 2013; N = Number of respondents

### Timing of loan disbursement

Concerning the timing of loan disbursement, from the total sample of respondents, 55.71% received their inappropriate credit time to perform intended business activities, and 44.29% responded that the timing of loan disbursement is not suitable. On the other hand, of the non-defaulter sample respondents, 73.21% of the borrowers said the timing

of loan disbursement was suitable, and 26.79% responded that the loan disbursement time was not suitable. In comparison, 44.05% and 55.95% of the defaulters received their credit at a suitable time and not a suitable time. Therefore, the percentage difference between the two groups regarding the suitability of credit disbursement was statically significant at 5% (Table 21). This implies that if the loan is disbursed inappropriate time to perform the desired activity, productivity and profitability will be high and reverse. Furthermore, if there are social events that the community may celebrate during loan disbursement, the borrowers will divert the loan to celebrate social ceremonies and face loan repayment difficulties. Therefore, the provision of the loan at a suitable time positively affects the credit repayment performance of smallholder farmers.

**Table 21: Distribution of sample borrowers by the timing of loan disbursement**

Variables	Non-defaulters (N=56)				Defaulters (N=84)				X <sup>2</sup> –Value	Total sample (N=140)			
	Yes		No		Yes		No			Yes		No	
	N	%	N	%	N	%	N	%		N	%	N	%
Loan disbursement at a suitable time	41	73.21	15	26.79	37	44.05	47	55.95	11.585**	78	55.71	62	44.29

Source: own computation, 2013; \*\* Represents significance at the level of 5%

N = Number of respondents

#### 4.2.4. Attitudinal Factors Affecting Loan Repayment Performance

##### Borrowers' Attitude towards borrowed resources

Regarding borrowers' attitudes toward the borrowed resource, from the total sample of respondents, 50%, 32.1%, 3.6%, 10.7%, and 3.6% strongly agreed, agreed, neutral, disagreed, and strongly disagreed with repaying the credit, complicated economic situation. Both defaulters and non-defaulter have the same attitude towards the borrowed resource. The majority of respondents, 82.1% from both the defaulter and

non-defaulter sides, agreed that credit from any source should be repaid even in problematic economic situations. This implies that the percentage difference between the two groups was not statistically significant (Table 22), so it is safe to say that default problems generally do not occur because of bad clients but bad lending methods.

**Table 22: Distribution of borrowers' attitudes towards borrowed resource**

Variables		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		χ <sup>2</sup> – Value
		N	%	N	%	N	%	N	%	N	%	
Non-defaulters (N=56)	Credit from any source should be repaid even in the hard economic situation	28	50	18	32.1	2	3.6	6	10.7	2	3.6	0.00
Defaulters (N= 84)	Credit from any source should be repaid even in the hard economic situation	42	50	27	32.1	3	3.6	9	10.7	3	3.6	
Total sample (N=140)	Credit from any source should be repaid even in the hard economic situation	70	50	45	32.1	5	3.6	15	10.7	5	3.6	

Source: own computation, 2013; \*\* Represents significant at the level 5% respectively;  
N = Number of respondent

### 4.3. Econometric Results

#### 4.3.1. Determinants of Agriculture loan repayment performance

As discussed in chapter three, the logit econometric model was selected to analyse the factors influencing agriculture borrowers' loan repayment performance. Before running the logistic regression model, the continuous and discrete explanatory variables were checked for multicollinearity and the degree of association using the Variance Inflation Factor (VIF) and contingency coefficients, respectively. The VIF values for continuous variables were very small (much less than 10), indicating the absence of multicollinearity between them (Table 23). Likewise, the computation of contingency coefficients reveals no severe association problem among discrete variables (Table 22). For this reason, all the explanatory variables were included in the final analysis. Specifically, seven continuous and nine discrete explanatory variables were used to estimate the logit model. The VIF values for continuous variables and contingency values for discrete variables are depicted in Tables 23 and 24, respectively.

**Table 23: VIF of the continuous Variables (X<sub>i</sub>)**

<b>Variables</b>	<b>Adjusted R<sup>2</sup></b>	<b>VIF</b>
Age of borrowers	0.111	1.125
Family size	0.261	1.354
Off-farm income	0.163	1.196
Borrowing experience	0.342	1.521
Farm size	0.174	1.211
Amount of other credit borrowed	0.358	1.56
Livestock ownership	0.269	1.368

Source: Own computation (2013)

**Table 24: Contingency Coefficient for Discrete Variables (X<sub>i</sub>)**

<b>Variables</b>	<b>Disbursement time</b>	<b>Health status</b>	<b>Interest rate</b>	<b>Education level</b>	<b>Loan diversion</b>	<b>Social ceremony</b>	<b>Loan Type</b>	<b>Follow-up</b>	<b>Training</b>
Disbursement time	0.271	0.017	0.213	0.190	0.083	0.100	0.001	0.078	0.105
Health status		0.059	0.154	0.131	0.021	0.087	0.009	0.016	0.362
Education level				0.12	0.138	0.246	0.229	0.09	0.250
Loan diversion					0.202	0.146	0.094	0.131	0.164
Social ceremony						0.069	0.099	0.24	0.094
Loan Type							0.05	0.105	0.078
Follow-up								0.077	0.190
Training									0.076

Source: Own computation (2013)

The logit regression model was estimated using the Maximum Likelihood Estimation Method to determine the explanatory variables that are good predictors of the loan repayment performance of agricultural credit borrowers. The results of the analysis are presented in Table 23.

**Table 25: The Maximum Likelihood Estimation of the logit model**

<b>Variables</b>	<b>Estimated Coefficient</b>	<b>Odd ratio</b>	<b>Std. Err.</b>	<b>Wald</b>
Constant	-5.501	0.004	1.277	18.557
Age of borrowers	5.931	0.003	2.196	7.297
Off-farm income	2.806***	16.563	0.801	12.271
Disbursement time	2.191**	8.946	0.770	8.105
Educational level	4.381	79.917	4.466	0.962
Family size	2.215	9.161	2.425	0.834
Health condition	3.800	44.696	3.619	1.103
Borrowing experience	1.150	0.317	0.460	6.256
Loan diversion	-3.363***	28.881	0.889	14.320

Social ceremonies	-2.877**	0.056	1.034	7.746
Training	2.020**	7.538	0.711	8.060
Follow- up	3.147***	23.268	0.781	16.221
Farm size	3.189	0.041	0.800	15.887
Amount of other credit borrowed	-0.349	0.705	0.499	0.489
Livestock ownership	3.603	36.692	0.724	24.793
Type of loan	-0.114	0.892	0.378	0.091

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Number of observation	140
Pearson chi-square	128.12
-2log likelihood Ratio	60.32
count R <sup>2</sup>	91.4

Source: Own computation (2013)

\*\*\*, \*\* is significant at 1% and 5% respectively

### **Goodness of Fit**

The goodness of fit in logistic regression analysis is measured using Count R<sup>2</sup>, which indicates the number of observations correctly predicted by the model. Count R<sup>2</sup> is based on the principle that if the estimated probability of the event is less than 0.5, the event will not occur, and if it is more significant than 0.5, the event will occur (Maddala, 1989). In other words, the i<sup>th</sup> observation is grouped as a non-defaulter if the computed probability is greater than or equal to 0.5 and as a defaulter otherwise. The model results show that the logistic regression model correctly predicted about 91.4 per cent of the total borrowers.

#### **4.3.2. Discussion of the Significant Explanatory Variables**

Out of the sixteen variables hypothesized to influence smallholder farmers' agricultural loan repayment performance, six were found to be statistically significant. The maximum likelihood estimates of the logistic regression model show that involvement in off-farm of the borrowers, regular follow-ups by the loan officers, loan diversion, the celebration of social ceremonies, suitability of loan disbursement time and provision of business-related

training for borrowers were essential factors determining the loan repayment performance of smallholder agricultural credit borrowers. The borrowers' coefficients in off-farm activity, loan diversion for unintended activities, and regular visit/ supervision by lending loan officers were statistically significant at less than or equal to a 1 per cent probability level. On the other hand, the variable loan disbursement time, training and celebration of social ceremonies of the borrowers were statistically significant at a 5% probability level. On the other hand, the coefficients of ten explanatory variables, namely, age of borrowers, other credit borrowed, loan type, whether cash or kind, family size of borrowers, cultivable farm size of the borrower, education level, health condition of the borrowers, ownership of livestock borrower, the interest rate of credit providing institutions and borrowers experience for formal credit were less potent in explaining loan repayment performance of the agriculture borrowers of agricultural lending institutions.

**Off-farm income is an economic factor that** positively and significantly affects the loan repayment performance of smallholder farmers (significant at 1%). This might be because off-farm activities were additional sources of income for smallholders, and the cash generated from these activities could back up the farmers' income to settle their debt even during bad harvesting seasons and when the repayment period coincides with low agricultural prices. The econometric model results revealed that other things being constant, the odds ratio favouring non-defaulters increases by a factor of 16.563 for borrowers involved in non-farm activities.

**Follow-up/supervision:** This is an important institutional factor positively related to the dependent variable (significant at 1 % probability level). The existence of regular follow-up by loan officers increases the odds ratio favouring being a non-defaulter by 23.268%, *ceteris paribus*. This implies that borrowers with more access to technical assistance and guidance on agricultural activities during the visit could repay their loan as promised than those who had no visit at all. This is because borrowers who have frequent contact with the loan officers and agricultural extension workers are better informed about markets and production technologies and lending institutions' rules and regulations on loan repayment. As a result, they are motivated to repay their loans timely compared to those without contact with loan officers/extension workers. Okorie (1986) have also reported the positive effect of this variable on loan repayment.

**Provision of business-related training:** According to the logit model, providing relevant training for credit users positively impacts the loan repayment performance of agriculture borrowers. It is significant at a 5% probability level. This is because borrower-trained borrowers could quickly adapt production techniques and technologies and do profitable business due to acquired knowledge, information, and experience related to the business engaged in and repay the debt on time. The odds ratio favours non-defaulter *ceteris paribus* (all other things being equal) and increases by 7.538% for borrowers who have received relevant training for business activities.

**Timing of loan disbursement:** The model estimate confirms that loan disbursement time's suitability has a significant and positive impact on the loan repayment performance of agricultural credit borrowers. It is significant at a 5% probability level. Other things held constant, the odds ratio favouring being non-defaulter increases by 8.946% for borrowers who have received their loan at a suitable time to be engaged in intended agribusiness activities. This might be because there are social events that the community may celebrate during loan disbursement. As the loan disbursement time is not appropriate for borrowers' planned activities, the borrowers will divert the loan's non-production purpose and face difficulty in loan repayment. As a result, borrowers who got the loan at a non-suitable time failed to repay the loan according to the contractual agreement.

**Celebration of social ceremonies:** The Logit model results reveal that this variable affects loan repayment performance negatively. The variable is significant at a 5% probability level. This implies that celebrating one or more social ceremonies needs much material and financial resources beyond what the borrowers could afford. This means the money that could have been used for loan repayment; might have been used to celebrate social ceremonies. Interpretation of the odds ratio of 0.056 for social ceremonies suggests that the *ceteris paribus*, the chance for a borrower to be a defaulter, increases by 0.056% for respondents who celebrate ceremonies. Miller (1977), Singh *et al.* (1985), Mwinijilo (1987), Zeller and Sharma (1998), and Belay (1998) have also reported the negative effect of this variable on loan repayment.

**Loan diversion:** The logit model results show that this variable affects loan repayment negatively. This is consistent with the *a priori* expectation. However, this variable is significant at less than a 1% significance level. This is because defaulters use production

credit for consumption purposes. The odds ratio favouring loan repayment performance decreased by 28.88% for borrowers who diverted the loan, keeping other things constant. This result is in complete agreement with the study made by Jama and Kulundu (1992).

### 4.3.3. Marginal effect of significant variable

All significant explanatory variables do not have the same level of impact on the loan repayment performance of borrowers. Therefore, in order to determine the relative importance of each explanatory variable on the repayment performance of borrowers, it needs to calculate the marginal effect of each explanatory variable, and the result after the logit model estimation is presented as follows:

**Table 26: Marginal effect of Significant Variables**

<b>Variables</b>	<b>dy/dx (Marginal Effect)</b>
Involvement in off-farm activities	0.943
Loan disbursement time	0.899
Loan diversion	-0.966
Social ceremonies	-0.053
Business-related training	0.882
Follow-up/ supervision	0.958

Source: Own computation (2013)

As the result of the estimation in table 24 indicated, the marginal effect of loan diversion for nonproductive borrowers was about 96.6 per cent, which is the highest when comparing it to another significant explanatory variable. The per cent implies that the probability of being non-defaulter decreases by 96.6 per cent for borrowers who divert loans for nonproductive purposes, assuming all other factors are constant. Next to loan diversion, follow-up/supervision significantly affects borrowers' repayment performance, *citrus paribus*; a borrower who has followed/supervised loan officers increases the probability of defaulters by 95.8 per cent. Involvement of off-farm income, loan disbursement time, business-related training, and celebration of social ceremonies are the third, fourth, fifth, and sixth important factors affecting borrowers' repayment performance.

# CHAPTER V

## 5. CONCLUSION AND RECOMMENDATIONS

## 5. CONCLUSION AND RECOMMENDATIONS

### 5.1. Conclusion

Introducing new technologies and adapting improved variety is crucial in transforming traditional and subsistence agriculture into a modern and market-oriented system. However, the performance of the agricultural sector in terms of both productivity and production in our country is poor, so food self-sufficiency has not been attained.

Using these improved technologies demands more capital than the farmers can afford. There is a wide gap between owned and required capital to finance these technologies since subsistence agriculture has no surplus beyond family consumption and other essential obligations for most households. Furthermore, there is a time gap between incurring production expenses and receiving farm income in the agricultural production process.

All these factors call for credit availability from external sources to fill the gap of financial deficiencies. One of the features of agricultural lending institutions is their provision of credit for smallholder farmers. The credit is extended until the next harvesting season (for one year). After that, the loan should be paid back to the lending institution for a sustainable credit supply. Contrary to this fact, it has been reported that arrears have infected the loan, and there has been a delinquency problem in the past two to three decades, even in good harvesting seasons. In most cases, this repayment problem went beyond lending institutions' capacity and started seeking assistance from the government. That is why the regional government development budget is used for loan repayment, and civil servants and other government personnel have been striving for loan repayment campaigns.

This study was intended to assess the financial and loan recovery performance of agricultural credit lending institutions of the study area and identify the factors which influence the loan repayment performance of smallholder farmers in the Sodo Zuria district who borrowed in the 2012 production season and assess the financial performance of agricultural lending institutions of the study area. The model included

institutional, demographic and socio-economic characteristics to study the problem of defaulting behaviour and smallholders' loan repayment performance. Primary data were collected from six randomly selected Kebeles and 140 sample households that obtained credit from more than one agricultural lending institution. Moreover, secondary data were obtained from zonal and district MFIs and cooperative and marketing departments.

Descriptive statistics, logistic regression model and financial ratio analysis were used for data analysis. Descriptive statistics results show that there were significant differences between defaulters and non-defaulters concerning Age, family size, cultivated land size, number of livestock owned, income from on-farm activities, income from the on-farm activity, loan diversion status of borrowers, health condition of the borrower, interest rate set by the lending institution, business development service provided by lending institution and timing of loan disbursement. On the other hand, from 16 explanatory variables used in the logit regression model, four variables (Income from non-farm activities, provision of business-related training; timing of loan disbursement, and follow-up/supportive supervision of Development Agent) had a statistically significant positive influence on loan repayment performance of the sample households. The other two variables (Loan diversion and celebration of social ceremonies) had a statistically significant negative influence on the loan repayment performance of the sample smallholder farmers. The model result reveals no contrary sign from Priori hypothesized among the significant explanatory variable.

Loan recovery is essential for all financial institutions involved in lending money. The review of secondary data shows that, concerning loan recovery performance, agricultural credit lending institutions of the study area have different performance levels; however, they borrowed from smallholder farmers in similar socioeconomic and macro-economic conditions. This difference in loan recovery performance resulted in the different financial performances of lending institutions. Consequently, the institution with minimum credit risk has better efficiency and overall performance.

Involvement in off-farm activities is one factor that has positively and significantly related to the loan repayment performance of agricultural credit borrowers of agricultural

lending institutions. This might be because non-farm activities were additional sources of income for smallholders. The cash generated from these activities could back up the farmers' income to settle their debt even during bad harvesting seasons and when the repayment period coincides with low agricultural prices.

The model result shows that regular follow-up/supervision significantly influences the loan repayment performance of agricultural credit lending institutions' loan users. This is because regular follow-up by loan officers/extension workers has positively and significantly related to loan repayment performance of agricultural credit borrowers of lending institutions. This implies that borrowers with more access to technical assistance and guidance on agricultural activities during the visit could repay their loan as promised than those who had no visit at all. This is because borrowers who have frequent contact with the loan officers and agricultural extension workers are better informed about markets and production technologies and lending institutions' rules and regulations on loan repayment. As a result, a borrower with frequent contact with a bank's professional was more likely to be a non-defaulter.

Loan repayment performance is positively and significantly related to the suitability of loan disbursement time. The possible explanation is that as the time of loan disbursement is suitable with the planned time in the business plan, it may not cause a mismatch in the harvesting period, the market problem for seasonal products, price escalation problem and disturbance of production schedule. This has a positive impact on the sustainability/profitability of the project and borrowers' repayment performance.

The model result shows that the loan diversion status of borrowers was the other important variable affecting the loan repayment performance of agricultural credit borrowers: The logit model results show that this variable affects loan repayment negatively. This is because the borrower who diverts production credit for smoothing consumption purposes or uses other unintended activities may misuse the given amount and be unable to repay the loan on the due date. This result shows that borrowers who have diverted loan status are more likely to be defaulters.

According to the logit model, providing relevant training for credit users positively impacts the loan repayment performance of agricultural credit borrowers of lending institutions. It is significant at a 5% probability level. This is because a trained borrower could quickly adopt new production techniques and technologies and do a profitable business due to acquired knowledge, information, and experience related to the business and repay the debt on time. As a result, borrowers who have received training on business-related topics are more likely to be non-defaulters.

Celebration of social ceremonies is another critical variable that affects loan repayment performance negatively. The variable is significant at a 5% probability level. This implies that celebrating one or more social ceremonies needs much material and financial resources beyond what the borrowers could afford. This means the money that could have been used for loan repayment; might have been used to celebrate social ceremonies. This result shows that borrowers who have celebrated one or more social ceremonies are more likely to be defaulters.

According to the descriptive analysis result, defaulters and non-defaulter have the same attitude towards borrowed resources. The majority of respondents, 82.1% from both the defaulter and non-defaulter sides, agreed that credit from any source should be repaid even in challenging economic situations. This implies that the percentage difference between the two groups was not statistically significant. So it is safe to say that default problems generally do not occur because of bad clients but because of bad lending methods.

## **5.2. Policy Recommendations**

This study can assist the agricultural lending institutions' policymakers in taking corrective measures since it indicates the most critical factors affecting the borrowers' capacity to repay the loan on time. The possible policy implications of this study include:

Loan recovery is essential for all financial institutions involved in lending money. It is recommended that lending procedures be consolidated into an integrated strategy to

reduce late payments and default loan portfolios. Since the low loan recovery performance resulted in weak financial performance and overall efficiency of the lending institutions.

The consequence of the loan diversion status of credit users decreases the repayment performance of the borrowers. So agricultural credit lending institutions should be given serious attention to minimising the loan diversion status of borrowers by applying different mechanisms. Some of the mechanisms to ensure the proper utilization of loans by smallholder farmers are: lending institutions should know their customers well unique; should evaluate the feasibility of clients' business plans; should provide a sufficient amount of loan at the right time; should keep a close watch to see whether the loans are being utilized for the purpose for which such loans granted.

The availability of regular follow-up/ supervision of borrowers' activities should be considered a significant part of credit activity because a borrower who gets information and advice from the lending institution is more likely to be a non-defaulters. Hence, the agricultural lending institution/policymaker should consider supervision or follow-up of the borrower's business intervention to provide information and technical support for the business venture's success established by the lending institution's loan.

The study result revealed that the probability of being non-defaulter increases as borrowers' involvement increases in off-farm activity, assuming *ceteris paribus*. As a result, agricultural lending institutions should encourage borrowers to be involved in feasible off-farm activity to reduce their arrears. Similarly, the suitability of loan diversion time for borrowers significantly impacts repayment performance. So to reduce the default rate, the agricultural lending institution should improve the appropriateness of loan disbursement time for its borrower.

Providing relevant training for credit users positively impacts the loan repayment performance of agricultural credit borrowers. This is because a trained borrower could quickly adopt new production techniques and technologies and do a profitable business due to acquired knowledge, information, and experience related to the business and repaying the debt on time. As a result, borrowers who have received training on

business-related topics are more likely to be non-defaulters. So, agricultural lending institutions should have planned resources and conduct relevant training for borrowers to reduce default rates.

Celebration of social ceremonies is another vital variable that affects loan repayment performance negatively. This implies that celebrating one or more social ceremonies needs much material and financial resources beyond what the borrowers could afford. This means the money that could have been used for loan repayment; might have been used to celebrate social ceremonies. So, the elders, community leaders, local associations and religious organizations should consider minimizing the number of traditional ceremonies to reduce the associated expenditure over time.

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# 7. APPENDICES

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## AGRICULTURE LOAN REPAYMENT PERFORMANCE BY SMALLHOLDERS FARMERS

### Appendix 1: Interview Schedule

- Introduce yourself and tell the purpose of the study before starting the interview
- Circle the letter for the closed questions
- Write interview questions clearly
- Use only pencil

Note: This Interview Schedule is used only for academic purposes. Thank you for your cooperation.

### General information

1. Name of the Kebele \_\_\_\_\_
2. Name of the lending institution \_\_\_\_\_
3. Name of the enumerator \_\_\_\_\_
4. Signature of the enumerator \_\_\_\_\_
5. Date \_\_\_\_\_

### I. Demographic Factors

1. Age \_\_\_\_\_ (years)
2. Gender a) Male b) Female
3. Marital Status a) Married b) Single c) Divorced d) Widowed
4. Educational level \_\_\_\_\_ (in grade)
5. What is your family size? Male \_\_\_\_\_ Female \_\_\_\_\_ Total \_\_\_\_\_
6. What is the economic status of your family? a) Economically dependent \_\_\_\_\_ (in number) b) Economically active \_\_\_\_\_ (in number)

## II. Economic Factors

1. What are the main sources of your income in order of importance? a) Sale of grains \_\_\_\_\_% b) Sale of livestock \_\_\_\_\_% c) Sale of vegetables \_\_\_\_\_% d) Others /Specify \_\_\_\_\_ (\_\_\_\_\_) %
2. Did the household involve in any off/non-farm activities in 2011/12 E.C.?  
a) Yes b) No
3. If Yes, in what type of activity? a) Petty trade (poultry & egg, milk & milk products, hides & skins, crop residue, honey) b) Casual work c) Handicraft d) Others /Specify \_\_\_\_\_
4. What was the estimated amount of income for the year?  
a) From farm production \_\_\_\_\_ Birr  
b) From off-farm ( if any ) \_\_\_\_\_ Birr  
c) Total income ( a + b ) \_\_\_\_\_ Birr
5. Health condition of the household  
a) Seriously ill  
b) In good condition  
c) Other (specify) \_\_\_\_\_
6. How much is your cultivable land size in hectares (own land)? \_\_\_\_\_
7. Did the household rent in /share someone's land? a) Yes b) No
8. If the answer to question no 7 is yes, what was the size of the cultivable land rented in/ shared in(ha) \_\_\_\_\_ and \_\_\_\_\_
9. If the answer to question no 7 is yes, what was/ were the reason (s) for renting in/sharing in? a. Availability of fertilizer and other farm inputs b. Because of land shortage, c. Because of the extra labour, I had \_\_\_\_\_ d. Others/ specify \_\_\_\_\_
10. Have you rented out/shared out land with other farmers? a) Yes b) No
11. If the answer to question No. 10 is Yes, what was the size of the cultivated land rented out/ shared out? \_\_\_\_\_ and \_\_\_\_\_(ha)
12. If the answer to question No. 10 is Yes, what was the reason for renting out/ sharing? a) Shortage of money to buy fertilizer and other inputs b) Disabled  
c) Shortage of ox d) Others (specify) \_\_\_\_\_

13. What is the fertility status of your farmland? a) Good b) Medium c) Poor

14. How much livestock do you have?

No	Type of livestock	Number	Amount ( in birr)
1	Cattle		
2	Sheep		
3	Goat		
4	Horse		
5	Donkey		
6	Others( specify)		

### III. Institutional Factors

1. How did you get input?

a) In cash b) In credit c) Both

2. Which one do you prefer?

a) In cash b) In credit c) Both

3. Is the repayment scheme set by the lending institution suitable? a) Yes b) No

4. If No, what are the reasons?

a) The starting time to repay is too early

b) The repayment period is short

c) The amount of repayment in each month is too large

d) Others \_\_\_\_\_

5. What do you suggest to make the repayment scheme suitable?

a) To give enough time before starting to repay

b) To make the repayment period longer

c) Others \_\_\_\_\_

6. The interest rate for credit set by the lending institution is:

a) High b) Medium c) Low

7. What happens if someone does not repay the loan (default)?

a) Loss of personal asset

b) Loss of social relationship

- c) Losing a second-time loan/repeated loan
  - d) Others \_\_\_\_\_
8. Do you know any people who are not repaying the loan? a) Yes b) No
9. If yes, what are the characteristics?
- a) Male or b) Female
  - b) Youngsters or b) Adults
  - c) Business borrower or b) Consumption borrower
  - d) Others \_\_\_\_\_
10. Why would someone not repay the loan?
- a) Lack of follow-up by loan officer
  - b) Weak legal enforcement for defaulters
  - c) Improper use of the loan
  - d) Lack of interest in doing business
  - e) Inappropriate time of loan disbursement
  - f) Some misuse the amount because it provided in cash rather than in kind
  - g) Someone divert loans to fulfil the need for social ceremonies and other consumption purposes
  - h) Others \_\_\_\_\_
11. Did you take training from a lending institution? a) Yes b) No
12. If yes, what kind of training do you take?
- a) Business training
  - b) Training on different microfinance services (credit, saving, insurance)
  - c) Other \_\_\_\_\_
13. By whom was this training given?
- a) By loan officers, b) By managers, c) By external bodies
  - d) Others \_\_\_\_\_
14. Was the training useful? a) Yes b) No
15. How many times the loan officer visits your business and checks your repayment status?
- a) Two times a month b) Once a month c) Once within two months
  - d) Once within three month
  - e) Others \_\_\_\_\_

16. Is the loan and repayment supervision made by one loan officer throughout the process (from loan application to final repayment)? a) Yes b) No
17. If No, do you know the reason? \_\_\_\_\_
18. Are you served in a good manner by the loan officer and other employees of lending institutions? a) Yes b) No
19. If No, what is/are the reason(s)?
- a) There is an information gap
  - b) The loan officers are busy
  - c) The loan officers are not disciplined
  - d) Others \_\_\_\_\_
20. Is your and the loan officer's age in a similar age range? a) Yes b) No
21. If Yes or No, is this matter in the interaction? a) Yes b) No
22. If yes, what is/are the impact(s)?
- a) Easy to communicate
  - b) Easy to understand each other
  - c) Others \_\_\_\_\_
23. If the answer to question 20 is No, is it a) Above b) Below
24. What is/are the impact(s) of this age gap? \_\_\_\_\_
25. Do you have the same gender (sex) as the loan officer? a) Yes b) No
26. If Yes or No, is this matter in the interaction? a) Yes b) No
27. If yes, what is/are the impact(s)?
- a) difficulty to communicate
  - b) we have a different perception
  - c) Others \_\_\_\_\_

### **A. Business-related questions**

1. In which types of businesses are currently engaged?

#### **1. Agriculture**

- a) On-farm production
- b) Animal husbandry
- c) Horticulture
- d) Poultry

- e) Bee farming
- f) Others \_\_\_\_\_

## **2. Small Enterprise**

- a) Petty trade
  - b) Food Processing
  - c) Metalwork
  - d) Construction
  - e) Cottage industry
  - f) Service delivery (transportation and others)
  - g) Others \_\_\_\_\_
2. How long has your business experience been?
- a) 1 year
  - b) 2 years
  - c) 3 years
  - d) 4 years
  - d) others \_\_\_\_\_
3. Did you conduct the market study (survey) before starting your business? a) Yes b) No
4. If No, why? \_\_\_\_\_
5. Are you able to access business information related to your business? a) Yes b) No
6. If Yes, how to get this information?
- a) From Mass media (TV, radio, newspaper, etc.).
  - b) From friends
  - c) From the loan provider
  - d) Others \_\_\_\_\_
7. Is your business successful? a) Yes b) No
8. If No, what do you use to repay your loan?
- a) From my personal asset (livestock, equipment...)
  - b) From other income sources
  - c) Do not want to repay
  - d) Others \_\_\_\_\_

## **B. Loan &Repayment related questions**

1. From which is the Agricultural credit service providing institution you borrowed?
- a) Rural saving and credit cooperative

- b) Multipurpose cooperative
  - c) Omo microfinance institution
  - d) Wisdom microfinance institution
2. Why do you prefer that institution over others?
- a) Appropriateness of credit disbursement and collection time
  - b) Proper follow-up and support service
  - c) Sufficient loan size
  - d) Fair interest rate
  - e) Others \_\_\_\_\_
3. Why do you borrow from agricultural lending institutions?
- a) For doing new business
  - b) For expanding an already existing business
  - c) Others \_\_\_\_\_
4. How many times did you borrow from agricultural credit institution?
- a) 1                      b) 2                      c) 3                      d) 4                      e) Others
- \_\_\_\_\_
5. How long it takes for the first application and loan collection?
- a) One week    b) Two week    c) One month    d) other \_\_\_\_\_
6. What is/are the reason(s) for the short/long loan collection process?
- a) Loan officers are qualified
  - b) Speedy procedure (short process)
  - c) Due to the lengthy procedure (process)
  - d) Many people apply for credit at one time
  - e) The loan officers are not willing to finish within a short time
  - f) Others \_\_\_\_\_
7. How much money do you borrow from an agricultural credit service-providing institution? \_\_\_\_\_
8. Did you spend the entire loan for running your business? a) Yes    b) No
9. If No, for what purpose do you spend?
- a) Consumption
  - b) Education for children

- c) Health care expenditure
  - d) To celebrate social ceremonies
  - e) Construction/renovation of the house
  - f) Others \_\_\_\_\_
9. Did you take the preferred amount of loan from the agricultural credit provider as your request? a) Yes b) No
10. If No, is it a) Lower b) Higher
11. Is the amount of loan taken from agricultural credit providers enough for doing all your business? a) Yes b) No
12. If No, what solution do you take?
- a) Borrow from other Microfinance institutions
  - b) Borrow from family or friends
  - c) Borrow from informal money lenders
  - d) Borrow from formal banks
  - e) Used by the available amount of money
  - f) Others \_\_\_\_\_
13. Do you borrow from other sources for various purposes (consumption, emergency...)?
- a) Yes b) No
14. If yes, from where do you borrow?
- a) Borrow from other Microfinance institutions
  - b) Borrow from family or friends
  - c) Borrow from informal money lenders
  - d) Borrow from formal banks
  - e) Others \_\_\_\_\_
15. Which loan do you repay first and why?
- a) The loan from Rural Saving and Credit Cooperative
  - b) The loan from other Omo Microfinance Institutions
  - c) The loan from Wisdom Microfinance
  - d) The loan from Multipurpose Cooperative
  - e) The loan from family or friends

- f) The loan from informal money lenders
- g) The loan from formal banks
- h) Others \_\_\_\_\_

16. Are you repaying your loan? a) Yes b) No

17. If yes, what is your repayment status?

- A. Fully repaid a) On time b) Too late
- B. Partially repaid a) On time b) Too late

18. Are you benefited by fully repaying your loan? a) Yes b) No

19. If yes, what are the benefits?

- a) Access to the next higher loan
- b) Build a good relationship with the loan provider
- c) To make the family stable
- d) Others \_\_\_\_\_

20. If your answer is No for # 16, what is/are the reason(s)?

- a) The cost of doing business is higher than the revenue
- b) Weak legal enforcement for defaulters
- c) Low supervision by the loan officer
- d) Personal problems (like sick.....)
- e) Improper use of the loan
- f) Others \_\_\_\_\_

#### IV. Psychological Factors: Borrowers' Attitude towards borrowed resources

S. No.	Borrowers' Attitude towards borrowed resource	Strongly Agree 5	Agreed 4	Neutral 3	Disagree 2	Strongly Disagree 1
1	There are several sources to borrow in the study area					
2	There is no proper source for loan advancement in the study area					
3	It is good to borrow from government-recognized institutions like MFI, Cooperatives etc.					
4	One should not borrow from other sources but from money lenders, friends and relatives etc.					
5	Credit from any source should be repaid even in the hard economic situation					
6	One should repay loan from family, friends and informal money lenders on time but formal loan from (government and/or Non-governmental organization) is for economic upliftment and need not be paid back					

#### V. General Questions

1. If you face any difficulties and challenges during the repayment process, please mention the significant challenges
2. What is your overall opinion about the agricultural credit scheme you borrowed from?

## **Appendix 2: Checklist for Focus Group Discussion (FGD)**

1. How do you see timely credit repayment activities for the past five years? If not fair, what are the reasons? What is the role of your organization's credit repayment activities?
2. What are the significant problems of timely agricultural credit repayment performance through your institution (Omo microfinance, wisdom microfinance, rural saving and credit cooperative)?
3. Do you have any strategy to overcome these problems? If your answer is yes, what are they?
4. Describe the possible reactions of borrowers whom a loan officer visits because their loan payments are overdue. How should the loan officer deal with them?
5. What are “acceptable” reasons for a delay in repayment? How should a lender respond to such reasons?
6. What factors should be considered when deciding whether to liquidate collateral or not?
7. What challenges or constraints in debt collection exist in your country? What mechanisms does your institution employ to overcome these challenges?
8. What common errors in lending procedures cause problem loans in your experience?

### Appendix 3: Conversion Factor to Estimate Tropical Livestock Unit (TLU)

S. No.	Types of Livestock	TLU Equivalent
1	Calf	0.25
2	Weaned Calf	0.34
3	Heifer	0.75
4	Young Bull	0.80
5	Cow and Ox	1.00
6	Sheep & Goat (Adult)	0.13
7	Sheep & Goat (Young)	0.06
8	Donkey (Adult)	0.70
9	Donkey (Young)	0.35
10	Horse & Mule	1.10
11	Chicken	0.013
12	Camel	1.25

Source: Storck *et al.*, 1991

## **8. ETHIOPIA – KEY TECHNICAL TERMS**

## 8. ETHIOPIA - KEY TECHNICAL TERMS

We include a list of key terms which is being used by Ethiopians practically and culturally. These Key terms will be helpful to know the actual meaning of the essential words will be helpful to the users who are reading this E-Book. The words from agro-ecological categories of land, agro-climatic seasons of the year, Informal Institutions, Public Administrative Units like District and Villages etc. The Ethiopian researchers have also used their concepts in the Thesis research documents. That is why; we have prepared a list of key terms which will make you understand while going through this document.

**Belg:** Long Rainy Season starts from February to June every year

**Birr:** Ethiopian Currency

**Dega:** Highland altitude

**Development Agent:** The one who disseminates the new technology and innovations to the model farmer and fellow Village farmers. There are many Development Agents for Agriculture, Health, Livestock and Natural Resource Management for every Kebele in Ethiopia.

**Idir/Edir:** It is social customary for Informal Financial Institutions in the Village which is helping people in an emergency like a death ceremony or a natural catastrophe like drought or flood.

**Iqub/Equb:** It is a traditional Informal economic Institution existing in both the Urban and the Village that saves cash. Equb will help poor people who cannot buy clothing, food, household equipment, etc. The small group consists of 30 to 40 members of the society who used to contribute 2 to 5 Birr weekly, and each member collects a maximum of 300 Birr. It is one of the popular mutual support schemes often formed by people affiliated with one another.

In other words, the number of members depends on the availability of like-minded people in the locality. Besides, the amount of money each member can contribute also

depends on the wealthiness of all members. Collection time can also be determined based on mutual agreements weekly, every 15 days or monthly.

**Indigenous Social Insurance Systems:** Idir/Edir, Mahber, Iqub/Equb

**Kebele:** A type of administrative division at the lower level, which is higher than the village. Kebele means “Village” in the Ethiopian language. The Kebele is the basic administrative unit of the Ethiopia Government.

**Kert:** Small plot size of land equivalent to 0.05 hectares

**Kolla:** Lowland mainly lower than 500 m above sea level.

**Mahber:** It refers to a support union, which is usually formed based on religious, ethnic, professional etc., affiliation whereby members contribute some amount of money voluntarily, which they will later use for individual, group, or community support programs.

**Meher:** Short Rainy Season starts from July to September every year

**Time Difference:** Ethiopia Standard Time is 3 hours ahead of Greenwich Mean Time (GMT+3). Ethiopia is in East Africa Time Zone (EAT).

**Timid:** Size of a plot of land covered by one pair of Oxen equivalent to 0.25 hectares.

**Woreda-** is called a “District”. Local administrative above Kebele level, which is equivalent to a District.

**Woyne Dega** – Mid Highland altitude

**Year Difference:** An Ethiopian year comprises 13 months, seven years behind the Gregorian Calendar. Ethiopians celebrated the new Millennium on September 11, 2007; the Ethiopians continued with the same calendar that the Roman church amended in 525 AD. Ethiopia's current year is 2012, and the European year is 2020.

## **9. GLOSSARY**

## 9. GLOSSARY

**Absolute poverty:** A situation of inability to meet the minimum income levels, food, clothing, healthcare, shelter, and other essentials.

**Adaptive Research:** Research conducted to validate, modify and/or calibrate a new technology to specific soil, climate, socioeconomic or environmental characteristics of a given area.

**Afforestation:** Conversion of bare land into forestland by planting forest trees. The planting of a forest crop on land that has not previously or not recently carried in a forest crop.

**After-Cultivation:** Harrowing, rolling, tilling, and other cultivations carried out in a field after the crop has emerged

**Agrarian system:** The pattern of land distribution, ownership, management, and the agrarian economy's social and institutional structure.

**Agribusiness:** Agriculturally related businesses that supply inputs (such as fertilizer or equipment) or are involved in the marketing of farm products, such as warehouses, processors, wholesalers, transporters and retailers. The combination of the producing operations of a farm, the manufacture and distribution of farm equipment and supplies and the processing, storage and distribution of farm commodities.

**Agriculture area:** Land used primarily for producing or collecting farm commodities. The land distinguishes between arable land under protective cover, land under permanent crops in the open air, and land under permanent meadows and pastures, both naturally grown or cultivated.

**Agriculture holding:** Economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production, without regard to title, legal form or size.

**Agricultural Operation:** The management and use of farming resources to produce crops, livestock or poultry.

**Agricultural Production:** Measured in the total output of a crop.

**Agriculture:** A broad class of resource uses includes all forms of land use to produce biological (biotic) products –animal or plant. The fundamental basis for agriculture is the miraculous process of photosynthesis, the many valuable products synthesized by it, and plants and animals, including human beings. Nature has endowed soils with immense nutrients, which support much of the agricultural activity. Agriculture is now predominantly dependent on external nutrient support to supplement soil fertility.

**Agro-climatic Regions:** The grouping of different physical areas into broadly homogenous zones based on climatic and edaphic factors.

**Agro-ecological Zone:** A land resource mapping unit, defined in terms of climate, landform, soils, and land cover, and having a specific range of potentials and constraints for land use. Essential elements in defining an agroecological zone are the growing period, the temperature regime and the soil units. A significant area of land is broadly homogenous in climatic and edaphic factors but not necessarily contiguous, where a specific crop exhibits roughly the same biological expression. Zones of similar agricultural performance are defined by soil and climate.

**Agroforestry:** Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboo etc.) are deliberately used same land management unit as crops and/or animals and some form of spatial arrangement or temporal sequence. In agroforestry systems, ecological and economic interactions exist between the different components.

**Alkali Soil:** Soils with exchangeable sodium percentage (ESP) above 15, electrical conductivity below four dS/m and usual pH above 8.0-8.5. It is also called sodic soil (high in Sodium). Deficiencies of nitrogen and zinc are the most important. All alkali soils are alkaline but not vice versa, as the soil can have an alkaline reaction but have an ESP below 15. Gypsum application and green manuring are essential components of the reclamation technology of these soils.

**Altitude:** Vertical distance above sea level.

**Analysis of Variance:** Analysis of variance is a method for testing a hypothesis about means. It is the most widely used statistical inference method for analysing experimental data.

**Annual Crops:** Crop plants complete their life cycles within a season or year, such as rice, wheat, maize, coffee and plantains. They produce a crop of seeds and die. Some of these crop plants may produce tillers. If such rooted tillers are separated from the main shoot and planted, each tiller will survive that season as a new plant but will not live until another disease.

**Applied Research:** This type of research in which the farmer can be used immediately can be applied to practical problems in the country or a region.

**Arable Land:** Land is ploughed, and crops are cultivated: agriculture is based on field crops such as Sorghum, millet, maize and vegetables. Arable land includes all land used in most years for growing temporary crops and lying fallow or has not been sown due to unforeseen circumstances. Arable land does not include land under permanent crops or land under protective cover.

**Asset ownership:** Land ownership, physical capital (factories, buildings, machinery, etc.), human capital, and financial resources generate income for owners.

**Attitudes:** The states of mind or feelings of an individual, group, or society regarding issues such as material gain, hard work, saving for the future, and sharing the wealth.

**Basic education:** The attainment of literacy, arithmetic competence, and elementary vocational skills.

**Bedload (erosion):** The sediment moves by sliding, rolling or salting on or near the streambed sediment, mainly by tractive or gravitational forces, but at velocities less than the surrounding flow.

**Bed:** Narrow flat-topped ridge on which crops are grown with a furrow on each side to facilitate irrigation and drainage of excess water or an area in which seedlings or sprouts are grown before transplanting.

**Biodiversity:** The variety of life forms within an ecosystem.

**Biodegradable:** A substance can be broken down or decomposed due to biochemical changes usually involving bacteria or fungi, e.g. cellulose is degradable cellulose decomposing fungi. This property reduces composting time by inoculating the material to be composted with suitable microbes.

**Broadcasting:** The action of spreading seeds, fertilizer or other agrochemicals on the soil surface. It is usually done before planting and is typically incorporated with tillage but may be unincorporated in no-till systems.

**Case Study:** The detailed study of an individual unit such as a household, farm, enterprise or activity. It contrasts with the survey approach in which some units are studied. The case-study approach is helpful for familiarisation and teaching purposes, whereas the survey approach is more oriented toward gaining information about the population of the relevant unit.

**Commercial Farming:** Specialized farming enterprise that is capital-intensive and aimed at profit maximization.

**Community Forestry:** Forestry developed in areas marginal to agriculture. Many community members are landless or small-scale farmers, often characterized by ecological and cultural diversity and the employment of traditional technologies. Communal land development is essential to this type of forestry.

**Compost:** Organic residues, or a mixture of organic residues and soil, that has been mixed, piled and moistened with or without the addition of fertilizer and lime and are generally allowed to undergo thermophilic decomposition until the original organic materials have been substantially altered or decomposed. Sometimes it is called “artificial manure” or “synthetic manure”. Conventionally, it has been categorized as

rural or urban compost according to the type and location of the composting waste. Composts are prepared through micro-organisms on wastes such as leaves, roots, stubbles, crop residues, straw, hedge clippings, weeds, sawdust, kitchen wastes, and human habitation wastes. The nutrient status of compost depends mainly on the nutrient content of the wastes and their preparation method.

**Conservation of Natural Resources:** The main principles of protecting natural resources are related to the improvement and use of natural resources that will assure their highest economic or social benefits for humans and their environment now and into the future. The management of human use of the biosphere may yield the most significant sustainable benefit to current generations while maintaining its potential to meet the needs and aspirations of future generations. Thus conservation is positive, embracing preservation, maintenance, sustainable utilization, restoration and enhancement of the natural environment.

**Conservation:** The management of natural resources to provide maximum benefits over a sustained period. In farming, conservation entails matching cropping patterns and agricultural lands' productive potential and physical limitations to ensure the long-term sustainability of profitable production. Conservation practices focus on conserving soil, water, energy and biological resources. Contour farming, no-till farming, and integrated pest management are standard conservation practices, divided into land management and structural practices.

**Contiguous Drought:** Drought resulting from irregular precipitation patterns cause a moisture deficit during the rainy season.

**Contract Farming:** Contract farming can be defined as an agreement between farmers and processing and/or marketing firms to produce and supply agricultural products under forwarding agreements, frequently at predetermined prices. The arrangement also invariably involves the purchaser providing a degree of production support through, for example, the supply of inputs and the provision of technical advice. The basis of such an arrangement is a commitment on the part of the farmer to provide a specific commodity in quantities and at quality standards determined by the purchaser and a

commitment on the part of the company to support the farmer's production and purchase of the commodity. The intensity of the contractual arrangement varies according to the depth and complexity of the provisions in each of the following three areas: 1. Market Provision: The grower and buyer agree to terms and conditions for the future sale and purchase of a crop or livestock product; 2. Resource Provision: In conjunction with the marketing arrangements, the buyer agrees to supply selected inputs, including land preparation and technical advice; 3. Management Specifications: the grower agrees to follow recommended production methods, inputs regimes, and cultivation and harvesting specifications. Contract farming is becoming an increasingly important aspect of agribusinesses, whether the products are purchased by multinationals, smaller companies, government agencies, farmer cooperatives or individual entrepreneurs.

**Cooperative Farming:** Co-operative farming is a system under which all agricultural operations or parts are carried out jointly by the farmers voluntarily; each farmer retains the right to land. The farmers pool their land, labour and capital. The land is treated as one unit and cultivated jointly under the direction of the elected management. A part of the profit is distributed in proportion to the land contributed by each farmer, and the rest of the profit is distributed in proportion to the wages earned by each farmer.

**Crop Productivity:** The quantitative production of a crop is in terms of its primary production per unit of land area. Usually, it is expressed as kg or tonnes per hectare. Same as crop yield. Example. Eight Tonnes grain/ha.

**Crop Yield:** The data reported under this element represent the harvested production per unit of harvested area for crop products. In most cases, yield data are not recorded but obtained by dividing the data stored under the production element by those recorded under the element; area harvested. Data are recorded in Kilograms or tons per hectare.

**Cropping Pattern:** The yearly sequence and spatial arrangement of the crops or crops and fallow in a given area. Includes sequential or multiple cropping, intercropping, mixed cropping, relay cropping etc. Example: rice followed by wheat, maize followed by wheat followed by the green gram.

**Cultivable Area:** Area of land potentially fit for cultivation. This term may or may not include part or all of the forests and rangeland.

**Cultivar:** A variety of plant species produced by selected breeding.

**Cultivation:** A tillage operation used in preparing land for seeding or transplanting or later for weed control and loosening the soil. Growing field crops, vegetables, fruits, trees, flowers, and fish.

**Dairy Farm:** A commercial establishment for processing or selling milk and milk products.

**Degradation:** The process whereby a compound is transformed into simpler compounds. The changing of soil to a more highly leached and highly weathered condition; is usually accompanied by morphological changes such as the development of an A2 horizon.

**Demonstration:** Practically showing the user the working of a particular practice or technology developed and established on a research farm.

**Disaster:** An occurrence of a natural catastrophe, technological accident, or effect of climate change or drought, then rural farmer households become a poorer or human-caused event that has resulted in severe property damage, deaths and/or multiple injuries.

**Drought:** An insufficient moisture supply from precipitation or soil for optimum plant growth. A period of abnormally dry weather was sufficiently prolonged for the lack of water to cause a severe hydrologic imbalance (i.e. crop damage) in the affected area. Drought severity depends upon the degree of moisture deficiency and the affected area's duration and size. It is months or years when a region notes a deficiency in its water supply. Generally, a region receives below-average precipitation over an extended period. Usually, it ranges from several months to several years. Although droughts can cause significant damage, drought is a typical, recurrent feature of the climate for most regions. Having adequate drought mitigation strategies in place can

significantly reduce the impact. In the worst-case scenario, recurring drought can also bring about desertification. As a drought persists, its conditions worsen, and its impact on the local population gradually increases.

**Dry Farming:** The practice of crop production in low-rainfall areas without irrigation. Crop production without supplementary irrigation in semi-arid regions is dependent on precipitation. Dryland farming requires the capture and efficient use of precipitation. The farming activities should be focused on retaining precipitation, reducing evaporation and utilizing drought-tolerant crops. Rainfed farming includes dryland farming, though these terms are not interchangeable. Both systems exclude irrigation, but rainfed agriculture can emphasize, i.e. the safe disposal of excess water.

**Central Tendency:** There are many measures of the centre of a distribution. These are called measures of Central Tendency. The most common are the mean, median and mode.

**Class Interval:** The class interval is a division of data for use in a histogram. For instance, it is possible to partition scores on a 100 point into class intervals of 1-25, 26-49, 50-74 and 75-100.

**Climate Variability:** Climate variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all temporal and spatial scales beyond individual weather events. Variability may be due to natural internal processes within the climate system (internal variability) or variations in natural or anthropogenic external forcing (external variability).

**Confidence Interval:** A confidence interval is a range of scores likely to contain the parameters being estimated. Intervals can be more likely to contain the parameters: 95% of 95% confidence intervals contain the estimated parameter, whereas 99% of 99% confidence intervals contain the estimated parameter. The wider the confidence interval, the more uncertainty there is about the parameter's value.

**Constant:** A value that does not change values such as  $T_i$  or the mass of the Earth is constant

**Continuous Variables:** Variables can take on any value in a specific range. Time and distance are continuous; gender SAT score and “time rounded to the nearest second” are not. Variables that are not continuous are known as discrete variables. No measured variable is truly continuous; however, discrete variables measured with enough precision can often be considered continuous for practical purposes.

**Dependent Variable:** A variable that is explained or affected by another variable. A variable that is measured is the experimental outcome. In most experiments, the effects of the independent variable on the dependent variables are observed.

**Developing Countries:** Asia, Africa, the Middle East, Latin America, Eastern Europe, and the former Soviet Union are presently characterized by low levels of living and other developmental deficits. Used in the development literature as a synonym for less developed countries.

**Development:** The process of improving the quality of all human lives and capabilities by raising people’s levels of living, self-esteem, and freedom.

**Diversified (mixed) farming:** The production of staple and cash crops and simple animal husbandry is typical of the first stage in the transition from subsistence to specialized farming.

**Discrete Variable:** Variables that can only take on a definite number of values are called “discrete variables”. All qualitative variables are discrete.

**Dummy Variable:** An artificial variable

**Economically Sustainable:** The characteristic of prolonged, careful, efficient and prudent (wise and judicious) resources (natural, fiscal, human), products, facilities and services. It is based on thorough knowledge and involves operating with little waste and accounting for all costs and benefits, including those not marketable and can result in savings.

**Environment:** The combined external condition affecting an organism's life, development and survival or ecosystem.

**Environmental System:** A system where life interacts with the various abiotic components in the atmosphere, hydrosphere and lithosphere.

**Environmentally Sound:** The maintenance of a healthy environment and the protection of life-sustaining ecological processes. It is based on thorough knowledge and requires or will result in products, manufacturing processes, developments, etc., which are in harmony with essential ecological processes and human health.

**Factors of production:** Resources or inputs required to produce a good or a service, such as land, labour, and capital. The inputs used in a production process. Generally, terms can be classified as land, labour, capital and management. However, management is not usually included in functional production analysis as it cannot be readily measured, and land, labour and capital may be further divided into different types.

**Family farm:** A farm plot owned and operated by a single household.

**Farm Enterprise:** An individual crop or animal production function within a farming system is the smallest unit for which resource use and cost return analysis is customarily carried out.

**Farm Forestry:** The growing trees are for timber, poles and fuelwood on farmland. This may be done in Small woodlots or as boundary plantings.

**Farmer:** The principal decision-maker involved in the management of a farm. Usually, but not always, will be head of the household. Sometimes the choice of principal decision-maker will be somewhat arbitrary since the decision-making may sometimes be segregated for different farm activities.

**Farming System:** Unit of analysis of agricultural production, defined by the components and boundaries and the types of interactions among the components and environments outside the boundaries. Farming systems include all agricultural and non-agricultural, under the control of farm household units. For example, a decision-making unit comprises a farm household, cropping, livestock systems, and fish production systems that produce crop and animal products for consumption and sale.

**Farm System Analysis:** Investigating farm-level constraints, translating this knowledge into improved technologies, and testing this technology.

**Farming Systems Types:** Shifting cultivation, fallow systems, ley and dairy systems, systems with permanent upland cultivation, systems with arable irrigation farming, perennial crops and grazing systems etc.

**Fixed Assets:** Durable assets represent long-term investments for more than one production cycle. Examples were breeding livestock, plant and machinery, land and building etc.

**Food Insecurity:** A situation exists when people lack secure access to sufficient amounts of safe and nutritious food for average growth and development and active and healthy life. It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level. Food insecurity may be chronic, seasonal or transitory.

**Food Security:** Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. A situation exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

**Focus Group Discussion:** A Qualitative method of data collection in which the information is collected in the context of a group utilizing relevant discussion

**Forestland:** Land on which the vegetation is dominated by forest or, if trees are lacking, the land bears evidence of former forest and has not been converted to other vegetation.

**Forestry:** The science of establishing, cultivating, and managing forests and their attendant resources. The science, art and practice of managing and using for human benefit the natural resources that occur on and in association with forest lands.

**Fragile land:** Land sensitive to degradation when disturbed, such as with highly erodible soils, soils where salts can and do accumulate, and soils at high elevations.

**Furrow Irrigation:** A method similar to corrugation irrigation used in permeable soils. It consists of feeding narrow furrows very close to one another with small discharges to quickly wet all the soil between two rows of crops (often orchards). Furrows parallel to the rows may be laid mechanically and reduce erosion.

**Gender roles:** Learned behaviours that condition activities, tasks, and responsibilities viewed within a given society as “masculine” or “feminine”.

**Global Warming:** Certain gases such as carbon dioxide, methane, nitrous oxides and chlorofluorocarbons (CFCs) absorb infrared radiation and trap it within the earth’s atmosphere. This heat, which would usually be dissipated into space, increases the earth’s temperature. An increase in the earth’s temperature would profoundly affect the world’s sea levels and climate. The control of these gases is, therefore, seen as a major international priority.

**Globalization:** Increasing integration of world production, commerce, communications and finance. More than merely the expansion of worldwide trade, globalization is based on improvements in the last two or three decades in telecommunication and information technology and financial sector reform that has opened domestic markets to foreign investors, especially in services, thereby intensifying (ing) the interpretation of local and international market forces worldwide.

**Gross Domestic Product:** The statistical measure of the total economic value of all the goods and services an economy produces in a given year. The size and rate of GDP growth are often taken as indicators of the level of development achieved by a society. GDP also contains many items, such as spending to clean up environmental damage, treat drug addicts, keep criminals in jail, and reflect on social difficulties rather than social well-being. However, GDP excludes essential items such as the unpaid costs of environmental damage and the lost value of depleted natural resources.

**Growing Season:** It is used generally, not as a technical term, to refer to when most crops are grown, e.g. the rainy season. The year period is when the environment enables farmers to produce a crop of economic value.

**Habitat:** The place or type of site where species and communities typically live or grow is usually characterized by a relatively uniform portion of the physical features or consistent plant form. Deserts, Lakes and forests are all habitats.

**Heterogeneous:** Non-uniform, variable, coming from outside. Their heterogeneous nature causes their constituents to segregate. Example: physical fertilizer mixtures.

**Hidden Hunger:** The nutritional status of a growing plant when it is experiencing a nutrient deficiency, but this effect is not severe enough to produce visible deficiency symptoms. One stage is below the critical level. However, hidden hunger does result in a loss in crop yield. A sound nutrient management programme aims at preventing hidden hunger.

**Household:** A household in the Ethiopian case is understood similarly as FAO (2005:4) defines “a household is an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form or size”. Households represent the actual production and consumption unit in rural societies and are agents of economic change. ii. Composed of the farmer and his family. It is considered both the production and consumption unit of the social organization. The household can be managed by one person or operation collectively. Family members live, sleep, eat, share the same place, and divide household duties, general farm management, and work.

**Human capital:** Productive investments embodied in human persons, including skills, abilities, health, and education, often resulting from expenditures on education, on-the-job training programs, and medical care.

**Independent Variable:** A variable that does not need to be explained by or is not affected by another variable. The variable is manipulated by the experimenter, as opposed to dependent variables. Most experiments observe the effect of the independent variable(s) on the dependent variable.

**Indicator:** A directly observable trait used to define a variable empirically.

**Inferential Statistics:** The type of statistics that makes conclusions from data derived through sampling and projects them onto the population

**Informal sector:** The part of the urban economy of developing countries characterized by small competitive individual or family firms, petty retail trade and services, labour-intensive methods, free entry, and market-determined factor and product prices.

**Infrastructure:** Facilities enable economic activity and markets, such as transportation, communication and distribution networks, utilities, water, sewer, and energy supply systems.

**Integrated Drainage:** It is a general term for a drainage pattern in which stream systems have developed to the point where all parts of the landscape drain into some part of a stream system. The initial or original surfaces have disappeared region drain to a typical base level.

**Integrated Farming System:** It integrates various agricultural enterprises, viz., cropping, animal husbandry, fishery and forestry etc. A judicious mix of any one or more with cropping complements the cropping enterprise.

**Intellectual Property Rights:** A right enabling an investor to exclude imitators from the market for a limited time.

**Intensive Cropping Systems:** Such cropping systems make relatively continuous use of the land for crop production. These do not allow a fallow period, and two or more seasonal crops can be raised in a year on the same piece of land through sequence cropping, inter/mixed cropping or both. Example: rice-wheat system, maize-wheat-green

gram system, coconut-pineapple-black pepper multi-storeyed cropping systems in which 4 crops grow in a field at any given time.

**Intensive Cropping:** Maximum land use utilizing regular succession of harvested crops.

**Intensive Farming:** A farming system to produce the maximum number of crops in a year with a high yield from the land available and maintain a high livestock stocking rate.

**Intercropping:** The growing of two or more crops on the same field per year, simultaneously or in the case of relay intercropping with an overlapping period. Simultaneously systems refer to the cultivation of two or more crops intermingled or with distinct row or strip arrangements. Here there is one main crop while the others are subsidiary crops, for instance, sesame+groundnut+sorghum+wheat+rice+mustard. It refers to growing two or more generally different crops simultaneously on the same land, base crop necessarily in a distinct row arrangement. The recommended optimum plant population on the base crop is suitably combined with an appropriate additional plant density of the associated crop. There is crop intensification in both time and space dimensions.

**Inventory** is a list of assets and liabilities, which are claims or debts against the business; in other words, it is a detailed list of farm properties with the value assigned.

**Irrigable Area:** Area capable of being irrigated, principally regarding availability of water, suitable soils, and land topography.

**Irrigated Land:** The cultivation area is artificially provided with water, other than rain, to improve the pastures or crop production. Uncontrolled land flooding by overflowing river streams is not considered irrigation.

**Integrated rural development:** The broad spectrum of rural development activities, including small-farmer agricultural progress, the provision of physical and social infrastructure, the development of rural nonfarm industries, and the capacity of the rural sector to sustain and accelerate the pace of these improvements over time.

**Key Informants:** These are community members who are exceptionally qualified to provide information about local conditions, usually due to their position within the community, e.g. local officials, community leaders, and other development workers. Key informants may provide background information or introductions to other community members or groups. The qualitative information will help to triangulate with quantitative data of the research.

**Land Area:** Total area excluding area under inland water bodies.

**Land Capability:** The suitability of land for use without permanent damage. As ordinarily used in the USA, land capability is an expression of the effect of physical land conditions, including climate, on the total suitability for use, without damage to crops that require regular tillage, for grazing, woodland and wildlife. In addition, the land capability involves considering the risks of land damage from erosion and other causes and the difficulties in land use owing to physical land characteristics, including climate.

**Land Cover** is the observed (bio) physical cover on the earth's surface. When considering land cover, describe the vegetation and the man-made features. Consequently, areas where the surface consists of bare rock or bare soil describe land itself rather than land cover. Also, water surfaces can be disputed as being natural land cover. However, in practice, the scientific community describes those aspects under the term land cover. Land cover is not to be confused with land use. For example, woodland or forests are land covers, but the land use may be hunting or rubber tapping.

**Land Degradation:** The deterioration is in land quality. Due to natural processes or human activity, such land can no longer adequately sustain an economic and/or original natural ecological function.

**Land Leveling:** Land preparation involves moving soil from high to low spots to achieve a flat horizontal surface so that irrigation water will be evenly distributed throughout the field.

**Land Preparation:** The process of preparing the soil is for planting to provide a soil environment favourable for plant germination and/or growth.

**Land Quality:** A complex land attribute that distinctly affects its suitability for specific uses. For example, the land quality “availability of water” directly affects crop yields and land suitability for different crops. Most land qualities can only be assessed by modelling the interaction of several land characteristics. For example, water availability is modelled from data or rainfall, the available water capacity of the soil, and potential evapotranspiration.

**Land System:** A land unit has a relatively uniform climate and a repeating pattern of landforms, soils, and vegetation. A land system may be divided into land facets.

**Land Tenure:** Land tenure refers to arrangements or rights under which the holder holds or uses land. Land rented out is not considered to be part of the holding. A holding may be operated under one or more tenure forms, with each parcel normally operated under one tenure form. All data regarding land tenure should be collected for the same time reference. Many land tenure systems allow people to use the same property for different purposes. For example, farming rights can belong to one person, while the trees to another and the fruit of the trees to someone else. Leasing and renting are kinds of land tenure, just as is share-cropping.

**Land forming:** Tillage operations move soil to create desired soil configuration. Forming may be done on a large scale, such as gully filling or terracing, or a small scale, such as contouring, ridging, or bedding.

**Landholdings:** Land owned, occupied, or used by farmers or tenant farmers.

**Landscape:** The fundamental traits of a specific geographic area, including its biological composition, the physical environment and anthropogenic or social patterns. A collection of related landforms; is usually the land surface the eye can comprehend in a single view. The landscape is a distinct association of landforms, as operated on by geological processes (exo-or endogenic) that can be seen in a single view.

**Land-use:** Land-use is characterized by the arrangements and activities inputs people undertake in a specific land cover type to produce, change, or directly link land cover and people's actions in their environment. A crop is not land use. The recreation area is

a land use term for different land cover types: sandy surfaces like a beach, a built-up area like a luna park, a forest etc.

**Land reform:** A deliberate attempt is reorganising and transforming agricultural systems to foster an equal distribution of agricultural incomes and facilitate rural development.

**Least developed countries:** A United Nations designation of countries with low income, low human capital, and high economic vulnerability.

**Less developed countries:** A synonym for developing countries.

**Likert Scale:** The respondent has to choose a scale introduced by Likert employing a set of response categories ranging from positive to very negative.

**Linear Regression:** A method of estimating the value of a Dependent Variable when the values of two-interval scaled and normally distributed variables are known.

**Literacy:** The ability to read and write.

**Livelihood Diversification:** In this study, livelihood diversification refers to the attempts by households to construct diverse ways to raise incomes and reduce vulnerability to different livelihood shocks. Therefore, livelihoods diversification is defined comprehensively as the proportion of both on-farm and non/off-farm activities in households' income-generating portfolios. Livelihood diversification can occur through agricultural diversification, i.e., producing multiple crops or high-value crops and livestock, and non-agricultural livelihood diversification, i.e., undertaking small enterprises or choosing nonagricultural sources of livelihoods like casual labour or migration.

**Livestock Systems:** A subset of farming systems, including cases in which livestock contribute more than 10 per cent to total farm output in value terms or where intermediate contributions such as animal traction or manure represent more than 10 per cent of the total value of purchased inputs.

**Livestock Unit:** A standard live weight unit for all grazing animals based on their respective live weight. A standard LU is 500Kg, with adult cattle representing 1.0 LU and adult sheep representing 0.0 LU.

**Livestock:** Refers to all animals kept or reared, mainly for agricultural purposes. It includes aquaculture for fish production.

**Low-income countries (LICs):** In the World Bank classification, countries with a gross national income per capita of less than \$976 in 2008.

**Microfinance:** Financial services, including credit, supplied in small allotments to people who might otherwise have no access to them or have access only on very unfavourable terms, including micro-savings and micro-insurance and microcredit.

**Multiple Regression:** Multiple regression is linear regression in which two or more predictor variables are used to predict the criterion

**Non-farm Income:** The typical non-farm activities that are pursued by rural households in Ethiopia: non-farm rural salaried employment; non-farm rural self-employment (sometimes called micro-enterprise income); rental income obtained from leasing land or property; urban to rural remittances arising from within national boundaries; other urban transfers to rural households, for example, pension payments and international remittances arising from cross-border migration.

**Non Governmental organizations (NGOs):** Nonprofit organizations often provide financial and technical assistance in developing countries.

**Off-farm income** involves working on other farms for wages or arrangements such as sharecropping or labour exchange in-kind. Off-farm income is strictly defined as income generated from working outside one's farm through participating in ploughing, weeding or harvesting on another farmer's land. Moreover, we also consider income from local environmental resource extraction such as firewood collection, charcoal production and gathering of wild fruits as off-farm income.

**On-farm Income:** Income generated from farming, whether on owner-occupied or leased land, includes livestock and crop income. Income is derived from crop production and the rearing and selling of animals. This includes income earned from commercial woodlots and beekeeping.

**Pilot Study:** A complete replica of the leading research study is employed in a fraction of the sample.

**Positive Association:** There is a Positive association between X and Y if smaller values of X are associated with smaller values of Y and larger values of X are associated with larger Y values.

**Pre-test:** A small-scale test administered before introducing a study aimed at measuring the efficacy of one or more main study elements. It helps to modify and update the Interview Schedule/Questionnaire.

**Qualitative Data:** The data collected should be from elderly people who are highly experienced in the research area.

**Quantitative Data:** The data to be collected from the concerned respondents or any published reports quantitatively.

**Qualitative Variable:** Also known as Categorical Variables, qualitative variables with no natural sense of order. They are, therefore, measured on a nominal scale.

**Random Sampling:** The process of selecting a subset of the population for statistical inference. Random sampling means that every member of the population is equally likely to be chosen.

**Regression:** Regression means “prediction”. The regression of Y on X is the prediction of Y by X.

**Regression Analysis:** A method employed to study the relationship between variables, especially the extent to which a dependent variable functions one or more independent variables.

**Sample:** A group of units chosen to be included in a study

**Significance:** A criterion related to the validity of data.

**Significance Level:** In significance testing, the significance level is the highest value of a probability value for which the null hypothesis is rejected. Typical significance levels are 0.05 and 0.01. If the 0.05 level is used, the null hypothesis is rejected if the probability value is less than or equal to 0.05.

**Smallholder Farmer:** In Ethiopia, the smallholder farmer meets the conventional meaning of small farms of less than 2 hectares per household. They are known for their resource constraints like capital, inputs and technology; their heavy dependence on household labour; their subsistence orientation; and their exposure to risks such as reduced yields, crop failure and low prices

**SPSS:** A statistical package for Social Sciences that the software could support with the help of computer-assisted research data analysis.

**Social capital:** The productive value of social institutions and norms, including group trust, expected cooperative behaviours with predictable punishments for deviations, and a shared history of successful collective action, raise expectations for participation in future cooperative behaviour.

**Social system:** The organizational and institutional structure of a society, including its values, attitudes, power structure, and traditions.

**Soil Productivity:** The capacity of the soil, in its typical environment, to produce a specified plant or sequence of plants under a specified management system. It emphasizes the capacity of the soil to produce crops and is expressed in terms of yield.

**Staple food:** A leading food consumed by a large portion of a country's population.

**Stakeholders:** A large group of individuals and groups of individuals (including governmental and non-governmental institutions, traditional communities, universities, research institutions, development agencies and banks, donors etc.) with an interest or

claim (whether stated or implied) which has the potential of having an impact on a given project and its objectives. Stakeholders with a direct or indirect “stake” can be at the household, community, local, regional, national or international levels.

**Subsistence Crop:** The crop grown under problematic conditions when no other crop can be grown, such as floating rice in flood-prone areas.

**Subsistence farm:** A low-income farm emphasising production for the farmer's use or the farmer's family rather than for sale.

**Subsistence Farming:** Growing crops and, where appropriate, keeping animals to provide food (cereals, pulses, vegetables and fruits), shelter materials, and possibly other products (fibres, medicinals) for family use.

**Sub-surface Irrigation:** Irrigation of crops by applying water below the surface of the ground through pipes.

**Surface Irrigation:** A irrigation method is when the water is applied to the land by allowing it to flow by simple gravity before infiltration. It includes various systems depending upon the relative magnitude of the surface flooding and infiltration phases after accumulation (submersion).

**Surface runoff:** Water from a catchment area that is discharged or lost without entering the soil.

**Surface Soil:** The uppermost part of the soil, ordinarily moved in tillage or equivalent in uncultivated soils ranging in depth from 7 to 25 cm. Frequently designated as the plough layer, the surface layer.

**Surface tillage:** Cultivating or mixing the soil to a shallow depth.

**Surface water:** All waters on the earth's surface, including fresh and saltwater, ice and snow, are distinguished from subterranean water, oceans, lakes, rivers etc. The runoff from paved or unpaved land or buildings is distinct from sewage.

**Sustainability:** Managing soil and crop cultural practices to not degrade or impair environmental quality on or off-site, and without eventually reducing yield potential due to the chosen practice through exhaustion of either on-site resources or non-renewable inputs.

**Sustainable Agriculture and Rural Development (SARD):** The management and conservation of the natural resource base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in agriculture, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable, and socially acceptable.

**Sustainable Agriculture:** An integrated system of farming that will, over the long term, satisfy food and fibre needs, enhance environmental quality, make the most efficient use of resources, sustain the economic viability of farm operations and enhance the quality of life. Overall, sustainable agriculture emphasizes management practices that take advantage of natural processes (such as nutrient cycles, nitrogen fixation, and pest-predator relationships), improve the match between cropping patterns and agronomic practices on the one hand and the productive potential and physical characteristics of the land on the other. Commercial fertilizers and pesticides are used selectively to ensure production efficiency and conservation of soil, water, energy, and biological resources. Sustainable agricultural practices include crop conservation tillage systems, including no-till planting methods, integrated pest management, and genetically improved crops and animals.

**Sustainable Development:** The management and conservation of the natural base, and the orientation of technological and institutional change, in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. It conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically feasible and socially acceptable.

**Sustainable land use:** Land use that achieves production sufficient to meet the needs of present and future populations while conserving or enhancing the land resources on which that production depends.

**Sustainable Production Systems:** Production systems are designed to remain viable indefinitely by not degrading the resource base, impeding continued production indefinitely. Sustainable implies continuous improvement based on the concept that we continue to learn about the results of our interaction with complex ecosystems. Therefore, we must remain in a constant mode of learning and documentation to hone our systems toward a perfect form.

**Sustainable Use:** The use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations. The uses of the biological products and ecological services of ecosystems are in a manner and at a rate that does not reduce the system's ability to provide those products and services to future generations. Sustainable use of the environment and its living resources is used at a rate that does not exceed its capacity for renewal to ensure its availability for future generations. Sustainable management involves our current generation while conserving natural resources and protecting the environment for the benefit of future generations.

**Sustainable:** Production systems that can meet present needs without reducing the capability to meet future needs. FAO has defined sustainability as "Sustainable development is the management and conservation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable".

**Temperature:** The measure of molecular motion or the degree of heat of a substance. It is measured on an arbitrary scale from absolute zero, where the molecules theoretically stop moving. It is also the degree of hotness or coldness. Surface

observations refer primarily to the free air or ambient temperature close to the earth's surface.

**Terrace:** A step-like surface bordering a stream or shoreline representing the former position of a floodplain, lake or seashore. A raised, generally horizontal strip of earth and/or rock constructed along a hill on or nearby on a contour to make the land suitable for tillage and prevent accelerated erosion. An earth embankment is constructed across a slope for conducting water from above at a regulated flow to prevent accelerated erosion and conserve water.

**Tillage:** The mechanical manipulation of the soil profile for any purpose, but in agriculture, it is usually restricted to modifying soil conditions and/or managing crop residues and/or incorporating chemicals for crop production.

**Tiller:** A vegetative branch of the rice plant composed of roots, culm, and leaves may or may not develop a panicle. Shoot arising from the main culm (stem).

**Topsoil:** The upper part of the soil, with the lower limit set at 30cm or shallower. The soil depth may be limited by a root growth-inhibiting layer, a hard rock, a pedo-genetically indurated layer, a chemically unfavourable layer, or a strongly contrasting layer.

**Topography:** The relief exhibited by a surface. Refers to the differences in elevation of the land surface on a broad scale. It is derived from the site's most representative or characteristic slope gradient.

**Wealth Ranking:** Information on households' relative wealth (or well-being) in a community can be gathered. Community members define how wealth (or well-being) is perceived locally and then put the households into those with the most significant level of wealth to the least. This technique is best used with individuals, but it should be carried out with at least three community members to avoid inherent biases arising due to the status of the respondents.

**Yield:** The aggregate of products from growth or cultivation, usually expressed in quantity per area. Amount of production per unit area over a given time. It is a measure of agricultural production. Crop yield can be total dry matter yield (grain+straw) or economic yield (grain only). Usually expressed as Kg/ha, Mg/ha (Mg=Megagrams) or tonnes/ha. The expression in the term “quintals (100/Kg) /ha” is getting out of use.

**Subsistence farming:** Farming in which crop production, stock rearing, and other activities are conducted mainly for personal consumption.

**Sustainable development:** A pattern of development that permits future generations to live at least and the current generation, generally requiring at least a minimum environmental protection.

**Survey:** A method of data collection employing systematic and structured verbal or written questioning.

**Sustenance:** The essential goods and services, such as food, clothing, and shelter, are necessary to sustain an average human being at the bare minimum level of living.

**Triangulation:** A research approach employing more than one data collection and analysis method.

**Underdevelopment:** An economic situation characterized by persistent low levels of living in conjunction with absolute poverty, low income per capita, low rates of economic growth, low consumption levels, poor health services, high death rates, high birth rates, dependence on foreign economies, and limited freedom to choose among activities that satisfy human wants.

**World Bank:** An organization known as an “international financial institution” that provides development funds to developing countries in interest-bearing loans, grants, and technical assistance.

# 10. SUBJECT INDEX

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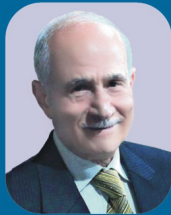
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In smallholder agriculture and low-income countries, like Ethiopia, where smallholder farming dominates the overall national economy, smallholder farmers often face a scarcity of capital due to low production levels to adopt new agricultural technologies. Hence, short-term and medium-term credits with favourable terms for seasonal inputs, like fertilizer, improved seeds, pesticides, herbicides and working tools, would generally be favoured because the better return would be achieved quickly within the cropping season. Moreover, achieving household food security remains a significant objective of rural development. This can be materialized by increasing agricultural productivity and off-farm income and improving households' ability to stabilize their income and food purchasing power. The authors explore the rationale and approach for exploiting the credit resources for the benefit of the smallholder farmers.



**Prof. Dr. Mohamed Rabie**

*President, Arab Thought Council in Washington*

Financial sustainability, which is the capacity of financial institutions to generate enough profit to become economically viable, is another important aspect of lending institutions that enables them to satisfy the supply side of the credit market. It is measured in terms of the capacity of institutions to generate enough overall revenue cost. Loan repayment is an essential criterion in assessing a financially sustainable credit program. However, the probability of default is very high in developing countries with a weak legal mechanism to enforce contracts and little opportunity for collateral before advancing loans. Therefore, low repayment performance jeopardizes the sustainability of lending institutions. This book will highlight the farmers' difficulties in obtaining the agricultural loan and repaying the loan in time and find the solution to manage the loan and repayment issues.



**Prof. Dr. Predrag Ilic**

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Besides giving large-scale loans, it also provides borrowers with small-scale, micro-credit loans. The research study found that male borrowers and borrowers with a longer repayment duration had a higher probability of default. Borrowers involved in non-production-oriented business activities such as in the service or the support sectors who had training in their particular business and borrowed higher loans had lower default probabilities. The repayment behavior in one agricultural corporation in Nigeria. Some research studies showed that the borrower's loan might be either cash or kind (seeds, fertilizer, and equipment), influencing the borrowers' repayment behavior. Moreover, the borrowers who received a loan in kind had higher repayment rates than borrowers who received a cash loan. Many borrowers misused the cash, diverting it into personal consumption instead of investing in making their business productive. Regular visits by the loan officer to the borrowers' business site and higher profits generated by the borrowers also contributed to higher repayments by borrowers. Overall, the loan repayment performance can be influenced by three factors: borrower, business, and lender characteristics. This book will bring new insights to the researchers, development practitioners, and NGO experts to conduct further research in this field.



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Technology and innovation are both vital tools for achieving sustainable farming and agriculture in the long term. However, most farmers from the least developed countries and many from the developing countries cannot afford new technologies or adopt innovative solutions. The lack of financial incentives or credit opportunities also discourages farmers from keeping farming in the related region. Most farmers from Africa have been suffering from insufficient quantity and quality of harvest with weak financial capital. At this point, new financial incentives or alternative projects can give helpful financial support to farmers. This study investigates the financial and loan recovery performance of agricultural credit lending institutions of smallholder farmers in the Sodo Zuria district in Ethiopia. By giving new shreds of evidence from Ethiopia, this book can contribute to both policymakers and future studies.

