

**IMPACT OF CREDIT ON RURAL LIVELIHOODS OF SMALLHOLDER  
FARMERS: A CASE OF KAGERA AGRICULTURAL AND ENVIRONMENTAL  
MANAGEMENT PROJECT**

**BY**

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## **ABSTRACT**

This study presents the results on the impact assessment of credit under Kagera Agricultural and Environmental Management Project (KAEMP) on rural livelihoods of smallholder farmers in Misenye district, Kagera region. The general objective was to assess the impact of agricultural credit under KAEMP on smallholder farmers' rural livelihoods. The specific objectives were to identify socio-economic factors within the project environment that influence the use of credit, assess the use of improved agricultural inputs between borrowers and non-borrowers and finally analyze livelihood changes resulting from the use of credit by smallholder farmers. Both primary and secondary data were collected using information search and survey. The main instruments for data collection were two structured questionnaires. The data collected were summarized and analyzed by using Statistical Package for Social Sciences programme (SPSS). It was revealed that the number of active family members and the income from off-farm income generating activities were the socio-economic factors which contributed largely to discriminate borrowers and non-borrowers. Moreover, the results show that there was a significant difference in the use of type of labour and modern agricultural inputs especially for dairy cattle keepers between borrowers and non-borrowers implying that credit influenced the use of modern inputs. In the case of livelihood indicators, results obtained in this study show significant difference on farmers' livelihood between borrowers and non-borrowers especially on housing materials used, livestock owned, value of household assets, farm tools used and farm and off-farm income entailing that credit influenced the improvement in rural livelihood. Basing on these findings, it is therefore concluded that all efforts be made to make agricultural credit effective since rural livelihoods can be improved by agricultural credit provision and hence alleviate poverty in the rural areas

where poverty is predominantly regarded as a rural phenomenon and subsistence agriculture is a major economic activity.

## DECLARATION

I, **Renatus Mutatina**, do hereby declare to the Senate of Sokoine University of Agriculture that, this dissertation is my own original work and it has not been or concurrently being submitted for a higher degree award in any other University.

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Renatus Mutatina  
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Date

The above declaration is confirmed

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Dr. Joseph P. Hella  
(Supervisor)

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Date

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## TABLE OF CONTENTS

<b>ABSTRACT.....</b>	<b>ii</b>
<b>DECLARATION.....</b>	<b>iv</b>
<b>COPYWRIGHT.....</b>	<b>v</b>
<b>ACKNOWLEDGEMENT.....</b>	<b>vi</b>
<b>DEDICATION.....</b>	<b>vii</b>
<b>TABLE OF CONTENTS.....</b>	<b>viii</b>
<b>LIST OF TABLES.....</b>	<b>xii</b>
<b>LIST OF FIGURES.....</b>	<b>xiv</b>
<b>LIST OF APPENDICES.....</b>	<b>xv</b>
<b>LIST OF ABBREVIATIONS.....</b>	<b>xvi</b>
<b>CHAPTER ONE.....</b>	<b>1</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>1.1 Background information.....</b>	<b>1</b>
<b>1.2 Problem statement and justification .....</b>	<b>4</b>
<b>1.3 General objective .....</b>	<b>6</b>
<b>1.4 Specific objectives.....</b>	<b>6</b>
<b>1.5 Hypotheses.....</b>	<b>6</b>
<b>1.6 Organization of the study.....</b>	<b>6</b>
<b>CHAPTER TWO.....</b>	<b>8</b>
<b>2.0 LITERATURE REVIEW.....</b>	<b>8</b>
<b>2.1 Definitions of key concepts.....</b>	<b>8</b>
2.1.1 Credit.....	8
2.1.2 Impact assessment.....	8
2.1.3 Livelihood.....	9
<b>2.2 Role of agricultural credit services in transformation of agriculture.....</b>	<b>9</b>
<b>2.3 Review of previous impact assessment studies.....</b>	<b>12</b>



<b>2.4 Impact of credit on smallholder farmers' livelihoods.....</b>	<b>14</b>
<b>2.5 Impact of credit on the use of modern agricultural inputs.....</b>	<b>16</b>
<b>2.6 Socio-economic factors which determine the use of credit by smallholder farmers.....</b>	<b>19</b>
<b>2.7 Impact of credit on agricultural production and farmers' income.....</b>	<b>22</b>
<b>2.8 Methods and approaches used to measure economic impact .....</b>	<b>24</b>
<b><i>CHAPTER THREE.....</i></b>	<b>26</b>
<b><i>3.0 METHODOLOGY.....</i></b>	<b>26</b>
<b>3.1 Theoretical and conceptual framework .....</b>	<b>26</b>
3.1.1 Theoretical framework .....	26
3.1.2 Conceptual framework.....	27
<b>3.2 Location and characteristics of the study area.....</b>	<b>30</b>
3.2.1 Location.....	30
3.2.2 Farming systems.....	32
3.2.3 Human population and infrastructure.....	32
3.2.4 Climate and topography.....	33
3.2.5 Economic activities.....	33
<b>3.3 Research design.....</b>	<b>34</b>
3.3.1 Sampling procedure .....	35
3.3.1.1 Population.....	35
3.3.1.2 Sampling and sample size.....	35
3.3.1.3 Data source and collection procedure.....	36
<b>3.4 Data processing and analysis.....</b>	<b>36</b>
3.4.1 Descriptive analysis.....	37
3.4.2 Multivariate Discriminant Analysis.....	38
3.4.3 Limitation of the methodology.....	39
<b><i>CHAPTER FOUR.....</i></b>	<b>40</b>
<b><i>4.0 RESULTS AND DISCUSSION.....</i></b>	<b>40</b>
<b>4.1 Smallholder farmers' socio-economic characteristics.....</b>	<b>40</b>
4.1.1 Household characteristics.....	40

4.1.2 Source of income for household.....	43
<b>4.2 Credit information and performance.....</b>	<b>44</b>
4.2.1 Credit information on non-borrowers side.....	44
4.2.2 Credit information and performance on borrowers .....	46
<b>4.3 Socio-economic factors which influence the use of credit by smallholder farmers .....</b>	<b>48</b>
4.3.1 Age.....	48
4.3.2 Household size .....	49
4.3.3 Farm size .....	49
4.3.4 Number of active members in the household .....	49
4.3.5 Off-farm income .....	50
4.3.6 Agricultural inputs expenditure .....	50
4.3.7 Assets value in the household .....	51
<b>4.4 Impact of credit on the use of modern agricultural inputs in crop and livestock production.....</b>	<b>55</b>
4.4.1 Type and number of labourers used on the farm .....	56
4.4.2 Use of improved seeds, manure and other agrochemicals.....	57
4.4.3 Crop and livestock inputs expenditure .....	59
<b>4.5 Impact of credit on smallholder farmers' livelihoods.....</b>	<b>61</b>
<b>4.5.1 Smallholder farmers' estimated income and expenditure .....</b>	<b>61</b>
4.5.1.1 Estimated income obtained from crop production.....	61
4.5.1.2 Estimated off-farm income .....	62
4.5.1.3 Expenditure on basic needs.....	63
4.5.2 Asset ownership .....	64
4.5.2.1 Ownership of household assets based on village accessibility.....	64
4.5.2.2 Estimated value of household assets.....	69
4.5.2.3 Ownership of land.....	70
4.5.2.4 Estimated value of farm tools and implements .....	70
4.5.2.5 Livestock ownership.....	71
4.5.2.6 Household size.....	72
4.5.2.7 House ownership and type of housing materials.....	73

4.5.3 Human and social capital among respondents.....	75
4.5.3.1 Access to health services.....	75
4.5.3.2 Status of a respondent to belong to social organizations.....	75
<b>CHAPTER FIVE.....</b>	<b>77</b>
<b>5.0 CONCLUSION AND RECOMMENDATIONS.....</b>	<b>77</b>
<b>5.1 Conclusion.....</b>	<b>77</b>
<b>5.2 Recommendations .....</b>	<b>78</b>
<b>REFERENCES.....</b>	<b>80</b>
<b>APPENDICES.....</b>	<b>95</b>

## LIST OF TABLES

<i>Table 1: Reasons for failure of credit schemes in different countries.....</i>	<i>5</i>
<i>Table 2: Respondents' selection.....</i>	<i>36</i>
<i>Table 3: Socio-economic characteristics of the respondents.....</i>	<i>41</i>
<i>Table 4: Major sources of income and sources of farm labour .....</i>	<i>43</i>
<i>Table 5: Credit information on non-borrowers side (n=60).....</i>	<i>45</i>
<i>Table 6: Credit information and performance on borrowers (n=60).....</i>	<i>47</i>
<i>Table 7: Tests of equality of means with respect to household characteristics.....</i>	<i>52</i>
<i>Table 8: Structure matrix showing the usefulness of each variable .....</i>	<i>52</i>
<i>Table 9: Discriminant function: Grand analysis results for number of active family members and off-farm income.....</i>	<i>53</i>
<i>Table 10: Standardized canonical discriminant function coefficients indicating the relative importance of the variables.....</i>	<i>54</i>
<i>Table 11: Functions of borrowers and non-borrowers at group centroids.....</i>	<i>55</i>
<i>Table 12: Type of labour used on the farm.....</i>	<i>56</i>
<i>Table 13: Number of labourers hired.....</i>	<i>57</i>
<i>Table 14: Use of modern agricultural inputs.....</i>	<i>57</i>
<i>Table 15: Estimated inputs expenditure on crop production.....</i>	<i>59</i>
<i>Table 16: Estimated inputs expenditure on livestock production.....</i>	<i>60</i>
<i>Table 17: Estimated income from the farm.....</i>	<i>62</i>
<i>Table 18: Estimated off-farm income .....</i>	<i>62</i>
<i>Table 19: Estimated expenditure on basic needs per annum.....</i>	<i>63</i>
<i>Table 20: Borrowers' ownership of transport facilities and news media based on accessibility.....</i>	<i>65</i>

<b>Table 21: Non-borrowers' ownership of transport facilities and news media based on accessibility.....</b>	<b>66</b>
<b>Table 22: Borrowers' and non-borrowers' ownership of transport facilities and news media.....</b>	<b>67</b>
<b>Table 23: Estimated value of household assets .....</b>	<b>69</b>
<b>Table 24: Land area possessed by respondents .....</b>	<b>70</b>
<b>Table 25: Estimated value of farm tools and implements .....</b>	<b>71</b>
<b>Table 26: Livestock owned by respondents.....</b>	<b>71</b>
<b>Table 27: Total members of household .....</b>	<b>73</b>
<b>Table 28: Housing materials used and other facilities .....</b>	<b>73</b>
<b>Table 29: Distance to health centres .....</b>	<b>75</b>
<b>Table 30: Status of a respondent to belong to social organizations .....</b>	<b>76</b>

**LIST OF FIGURES**

*Figure 1: Conceptual framework of the study.....28*

*Figure 2: A map of Misenye district showing a study area.....31*

**LIST OF APPENDICES**

*Appendix 1: Credit borrowers' questionnaire.....95*

*Appendix 2: Non- credit borrowers' questionnaire.....100*

## LIST OF ABBREVIATIONS

ADB	African Development Bank
ADBP	Agricultural Development Bank of Pakistan
AGREST	Agricultural Economics Society of Tanzania
APFS	Agricultural Production Financing Scheme
DFID	Department for International Development
ESRF	Economic Research Social Foundation
FARMESA	Farming Systems Approach to Technology Development and Transfer
FGD	Focus Group Discussion
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
IPM	Integrated Pest Management
IRDP	Isoya Rural Development Project
KAEMP	Kagera Agricultural and Environmental Management Project
KALIDEP	Kagera Livestock Development Project
KCU	Kagera Co-operative Union (1990)
KFCB	Kagera Farmers' Co-operative Bank
MDA	Multivariate Discriminant Analysis
NALERP	National Agricultural and Livestock Extension Rehabilitation Project
NBS	National Bureau of Statistics
NGOs	Non-Governmental Organizations
PADEP	Participatory Agricultural Development Empowerment Project
REPOA	Research on Poverty Alleviation
RFMS	Rural Financial Markets Studies
SGAs	Seed Growers Associations



SL	Sustainable Livelihoods
SME	Small and Medium Entrepreneurs
SPSS	Statistical Package for Social Sciences
SSA	Sub-Saharan Africa
TANESCO	Tanzania Electric Supply Company Limited
TARP II	Tanzania Agricultural Research Programme phase II
TPB	Tanzania Postal Bank
URT	United Republic of Tanzania
USAID	United States Agency for International Development
ZTBL	Zarai Taraqiati Bank Limited

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background information

Smallholder farming is the key to the incomes, livelihoods, export earnings and food supplies in most parts of Africa especially rural areas. For the case of Tanzania, smallholder farming dominates agricultural production, and a large proportion is for subsistence. Smallholder's production has provided the lion's share of growth in farm output, and has kept pace with increased demand in most countries (Toulmin and Gueye, 2005). But smallholders face a challenging future as local markets and food systems become increasingly globalized. If the goal of reducing poverty is to be achieved, it is argued that governments and donors must strengthen family farms and cut back on farm and export subsidies in rich countries (Toulmin and Gueye, 2005).

In Kagera region agriculture contributes about 50% of the regional economy (NBS, 2003). The total arable land amounts to about 1 868 750 ha, while on average 15% of this (285 045 ha) is cultivated annually. About 116 782 ha are under permanent crops mostly banana, coffee, tea, cassava and other non-traditional crops such as vanilla. A traditional major export crop in Kagera region particularly Bukoba, Muleba and Misenye districts is coffee. Banana and beans are used as food crops. In some parts maize and cassava are used as food crops due to poor performance of banana (KAEMP, 2000).

Agricultural sector in Kagera region since the seventies has been constrained by several factors such as declining soil fertility, emergence of pests and diseases which have reduced banana (*Musa spp*) yields from about 10 to 4 tonnes per hectare (Gallez *et al.*, 2004). In addition, since 1994, the influx of over a half a million Rwandan refugees has severely

aggravated environmental degradation and undermined the ability of the indigenous villagers to sustain their livelihoods (Rutinwa and Kamanga, 2003).

Moreover, credit has been observed as an important tool for channeling funds into agriculture and other rural development projects. Credit is also expected to enable increased productivity through increased use of modern agricultural inputs. The evidence has also shown that commercial and rural development banks in Tanzania will not normally lend to smallholder farmers because these farmers have little security to guarantee the loans, have low experience credit management and are unable to prepare feasibility studies or meet the high interest rate (Due and Kurwijila, 1991).

Furthermore, smallholder farmers usually find it difficult to obtain loans from formal lenders due to different reasons including lack of credit experience, credit accessibility and little security to guarantee the loans because of the inability of farmers to secure collateral (Somji, 2007). In Tanzania as a whole, only 6% of people have access to financial loans from banks, and the agricultural sector only accounts for 1% of the loans (Somji, 2007). In the study on moving out of poverty in Kagera region by De Weerd (2006), respondents in the Focus Groups Discussion (FGD) conducted in Muleba district, pointed out that lack of credit and knowledge were important obstacles to move out of poverty.

In Tanzania, like in other parts of Africa, lack of credit severely constrains sustainable agricultural development. Without credit, the millions of cash-starved smallholder farmers who dominate the rural landscape are unable to adopt most productivity-enhancing technologies. Low-return, diversified, subsistence-oriented production practices therefore continue to underpin most rural livelihood strategies (Rweyemamu *et al.*, 2005). Returns to farming are threatened by cheap imports of food, falling world market prices and

difficulties in accessing credit and inputs (Toulmin and Gueye, 2005). However, Tripathi and Chandra (1994) reported that credit had a favourable impact on crop returns, and thus provision of short-term credit is an effective way of increasing farm returns.

Different policies and strategies for agricultural sector development have been formulated, so that the agricultural sector contributes fully to the poverty reduction and improvement of the rural livelihoods. One example of the strategies which was formulated by the government of Tanzania in Kagera region was to prepare a long-term development project which was financed by the International Fund for Agricultural Development (IFAD) known as Kagera Agricultural and Environmental Management Project (KAEMP) in 1996. This was a six- year regional project implemented in five districts namely Bukoba rural, Muleba, Karagwe, Biharamulo and Ngara. Its objectives included improving household food production, health facilities and accessibility of safe drinking water and roads so as to ease marketing of agricultural produce. It also sought to improve and help the indigenous villagers to develop their own livelihood and the management of natural resources.

Agricultural development was the major component of the project. This component entailed the multiplication of seeds and planting materials and facilitated the availability and retailing inputs such as fertilizers and pesticides. The activities of this component also included cash and crop diversification trials and demonstration so as to improve crop management. Moreover, under the component of agricultural development, KAEMP formulated Seed Growers Associations (SGAs) in each division. The SGAs were responsible for seeds multiplication and planting materials and distributing them to farmers.

In its efforts to increase household food production and incomes of smallholder farmers, KAEMP had another component of providing credits to smallholder farmers under the major component of agricultural development. This task was undertaken by two banks namely Tanzanian Postal Bank (TPB); and Kagera Farmers Cooperative Bank (KFCB) starting from 2002 under the scheme known as Agricultural Production Financing Scheme (APFS). The banks worked in collaboration with the SGAs where the latter deliver credit to the farmers. The districts involved in this scheme were Bukoba rural<sup>1</sup>, Muleba and Karagwe.

## **1.2 Problem statement and justification**

Over years, agricultural production has been declining despite the fact that several attempts to revamp it have been implemented. Such efforts are Tanzania Agricultural Research Programme phase II (TARP II), National Agricultural and Livestock Extension Rehabilitation Project (NALERP) and Participatory Agricultural Development Empowerment Project (PADEP). The main objective of these attempts was to raise the production of food, incomes, and assets of participating households and groups. For example, in Kagera region factors such as declining soil fertility and the emergence of pests and diseases have reduced banana (*Musa spp.*) yields from about 10 to 4 tonnes per hectare (Gallez *et al.*, 2004). Similarly, most farmers have limited capital and access to financial services hence poor adoption of recommended agricultural techniques. Thus, agricultural credit is considered to be the solution to this problem. Many scholars (e.g. Tripathi and Chandra, 1994) reported that credit had a favourable impact on crop returns; hence provision of short-term credit is an effective way of increasing farm returns.

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<sup>1</sup> Bukoba rural district is now divided into two districts i.e. Bukoba rural and Misenye districts

KAEMP through APFS has been delivering credits to farmers since 2002. Therefore, assessing its impact on rural livelihoods is important since previous studies elsewhere have indicated that most credit schemes in rural areas have been a failure due to several factors including very small number of credit applicants, very high rate of default and delay on loan and credit repayments see Table 1.

**Table 1: Reasons for failure of credit schemes in different countries**

No.	Country	Reasons for failure	Sources
1	Tanzania	Poor credit management	Makombe <i>et al.</i> (1999)
2	Indonesia	Delay in credit repayment	Sjah <i>et al.</i> (2003)
3	Iran	Lack of experience and less security	Yazdani and Gunjal (1998)
4	Nigeria	Untimely loan disbursement	Okunade (2007)
5	Nigeria	Loan default	Oni <i>et al.</i> (2005)
6	Bangladesh	Lack of equipped skills and experience	Rutherford (1996)
7	Tanzania	Poor repayment period	Nyimbo (2001)
8	Pakistan	Procedural difficulties in loans disbursement	Iqbal <i>et al.</i> (2003)
9	Turkey	Traditional behaviour	Kizilaslan (2007)
10	Sri Lanka	Geographic and socio-cultural barriers	Shaw (2004)

The amount of loan which has been disbursed by this scheme in Misenye district is TShs 204.37 million. The loan was disbursed to 244 borrowers. So far no study has been conducted to see whether the credits which are being offered have impact on the livelihoods to these farmers. This study therefore examined the impact of credit provided by KAEMP through APFS on the use of improved agricultural inputs and rural livelihoods since the credit scheme was started.

It is important to assess the impact on the farmers' livelihoods in the course of administering agricultural projects so that to be informed on the effectiveness of the project in terms of the expected outputs. Since this study is dealing with impact assessment, its results will show the effects of the project output on the target beneficiaries and will have potential contribution to the development of this agricultural production financing scheme.

### **1.3 General objective**

The general objective is to assess the impact of agricultural credit under KAEMP on smallholder farmers' rural livelihoods.

### **1.4 Specific objectives**

Specifically the study was sought to:

- i. To identify socio-economic factors within the project environment which influence the use of credit.
- ii. To assess the use of improved agricultural inputs between borrowers and non-borrowers.
- iii. To analyze livelihood changes resulting from the use of credit on smallholder farmers.

### **1.5 Hypotheses**

The study was directed by the following hypothesis:

- i. Socio-economic factors of smallholder farmers have no influence on the use credit from KAEMP.
- ii. There is no significant difference in the use of improved agricultural inputs between borrowers and non-borrowers of credit from KAEMP.

### **1.6 Organization of the study**

This study is organized in five chapters. After this first chapter which presents the background information, the role of agricultural credit and the rationale of the study, the second chapter dwells on the relevant literature reviews from all corners of the globe. The third chapter covers the research methodology while the fourth chapter presents the results

and discussions of the study. Conclusion and recommendations are presented in chapter five.



## **CHAPTER TWO**

### **2.0 LITERATURE REVIEW**

#### **2.1 Definitions of key concepts**

##### **2.1.1 Credit**

Credit means money lent with an interest for profit. A lender makes a loan with the idea that the borrower will pay back as agreed and that an interest will be paid as some sort of rent use or price of borrowing of the money (Berthold, 1996). Under NGOs perspective credit is generally understood as a supply of money or inputs by a donor institution to the project executing agencies or NGOs so that the latter may pass some of it to the target groups in the form of loans, enabling them to finance the development activities over a set period of time and repay the loan with interest (Berthold, 1996).

##### **2.1.2 Impact assessment**

Impact assessment is a management mechanism aimed at measuring the effects of projects on the intended beneficiaries. The rationale is to ascertain whether the resources invested produce the expected level of output and benefits as well as to contribute to the mission of the organization that makes the investment (Afrane, 2001). Also impact assessment is a measure of the direct output on ultimate beneficiaries; it provides a measure of contribution of project in a broader development goal of the project (Makungu, 2004). It is also referred to, analysis or evaluation of the potential results of a particular programme, which provides an approximate order of magnitude to be used by stakeholders (IFAD, 2002).

### **2.1.3 Livelihood**

Livelihood implies a means of living (set of activities a human being applies to earn every day life) (Hornby, 1992). According to Chambers and Conway (1992) a livelihood is sustainable if it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the long and short terms.

According to George (2003) and Ponte (2002), livelihood comprises the capabilities, assets (material and social resources included) and activities required for means of living. So when it comes to impact assessment, it means that changes in measurable terms (such as cash and yield) must be assessed not in their own right but in terms of the contribution they have to livelihoods. Therefore, contribution may be direct or indirect (adding to income, health, food and social status improvement).

Ellis (2000) explained that livelihood comprises the assets (natural, physical, human, financial and social capital), the activities and access to these (mediated by institutions and social relation) that together determine the living gained by an individual or household. A fundamental characteristic of livelihoods in developing countries is the ability to adopt in order to survive.

### **2.2 Role of agricultural credit services in transformation of agriculture**

The estimation of the effects of agricultural credit becomes an important indicator for evaluating an antipoverty strategy. However, the importance of credit stems from the fact that it creates employment opportunities and enables these opportunities to be exploited. Temu (1988) argues that credit has the potential to act as a force to the development of

agricultural sector. In many developing countries, farm households receive subsidized interest rate loans, one of the direct credit policies to improve the credit access of rural households (Channgakham, 2006). Three main factors that contribute to agricultural growth are the increased use of agricultural inputs, technological change and technical efficiency. Technological change is the result of research and development efforts, while technical efficiency with which new technology is adopted and used more rationally is affected by the flow of information, better infrastructure, and availability of funds and farmers' managerial capabilities. Higher use and better mix of inputs also requires funds at the disposal of farmers. These funds could come either from farmers' own savings or through borrowings (Iqbal *et al.*, 2003). In less developed countries like Pakistan where savings are negligible especially among the small farmers, agricultural credit appears to be an essential input along with modern technology for higher productivity (Iqbal *et al.*, 2003).

In all situations in Benin, for example, some weeds were found difficult to eradicate, causing substantial food crop yield losses and threatening the livelihood of people. Land and labour shortage, low commodity prices and lack of credit were the main constraints hindering weed management. This was revealed in the study which was carried out in Benin in five agro-ecological zones aiming at identifying the relative importance of weeds among major production constraints. The study also aimed at suggesting the development of weed management strategies that work and are acceptable under small-scale farmers' conditions (Vissoh *et al.*, 2004).

Provision of credits to farmers plays an important role to promote agricultural production and the use of modern technologies. In the study which was conducted in Cuttack district of Orissa examined the differences in the use of inputs, costs, returns and resource use

efficiencies of borrower and non-borrower rice growers. The study noted that the borrowers had used higher amounts of critical inputs that enabled them to obtain higher per hectare yield compared to non-borrowers. Both borrowed and owned funds can be used in rice production with regard to optimization of resources, credit recipients could get maximum profit from rice production through optimum use of credit financed inputs (Satapathy and Tripathy, 2001).

The importance of credit provision to farmers lies on the argument that credit is expected to enable farmers to acquire more modern agricultural inputs for creating employment and other economical opportunities (Ponte, 2002). Where economic opportunities already exist, access to credit facilities can contribute to faster and more extensive adoption of improved technology which is consistent with raising the level of productivity and the level of income hence the general smallholder farmers' livelihood (Wangwe and Lwakatare, 2004).

The diversity of rural livelihood in low income developing countries is receiving increased attention in discussions about rural poverty reduction. Ellis (2000), found that reasons for households to adopt multiple livelihood strategies, diversity was based on six determinants of diversification which are seasonality, risk, labour markets, credit markets, asset strategies and coping strategies. Ellis (2000), realized that in order to attain rural survival in many low income countries diversification has positive attributes for livelihood security that outweigh negative connotations it may possess.

Fan and Chan Kang (2005) revealed that small farms characterize agriculture in Asia and small scale – farmers in Asia play an important role for food security and poverty alleviation. They also found that there is a positive relationship between farm size and labour productivity (and therefore income). Furthermore, Fan and Chan Kang (2005),

found that, in order the small farms to prosper, it is necessary for the governments to help small scale-farmers to have access to credit, marketing and technology, moreover, promoting diversification in the production of high-value commodities can play an important role in raising smallholder farmers' income.

Ahluwalia (1996) identified six areas of importance as the key policy issues which are involved in achieving the objective to faster agricultural growth of around 4% per year in India. The areas were public investment versus subsidies in agriculture, trade liberalization, extending deregulation to agriculture, agricultural credit, the role of agro-processing in stimulating agricultural development and technology development and research.

In the examination on the sustainability of conventional and ecological agricultural systems based on environmental soundness, economic viability and social acceptability, significant differences were found. The differences were found in crop diversification, soil fertility management, pests and diseases management, and use of agrochemicals. The findings suggest that ecological agriculture is relatively more sustainable, and it could be an economically and environmentally viable alternative to the conventional agricultural system. Ecological agriculture could become an alternative if market distortions created by subsidies were removed, and financial benefits were provided to resource – conserving farmers along with necessary support through extension, credit, research, and marketing (Rasul and Thapa, 2003).

### **2.3 Review of previous impact assessment studies**

Impact assessment studies have become an increasingly important aspect of development activity as agencies, and particularly donors, have sought to ensure that funds are well spent (Hulme, 2002). As part of this learning process, donors, credit lenders and

governments have been interested in knowing to what extent these credit interventions impact the beneficiaries. Impact studies have been associated with a greater focus on the outcomes of interventions, rather than inputs and outputs (Hulme, 2002), hence, a number of impact studies on the performance of microfinance projects have been undertaken in recent years, with different approaches and results.

In comparing two agro – environments with similar aspects but different irrigation infrastructure, Bhatia (1991) reported the scale of irrigation impact by comparing farm financial indicators (such as gross income, farm expenditure and net farm income) across irrigated and un-irrigated regions in the state of Bihar, India. In his study, he found that, the difference in the set of aggregate level farm returns and irrigation management indicators between the two states clearly demonstrates the extent of irrigation impact in the development of a region.

Khandker and Faruqee (2003), while studying the impact of farm credit in Pakistan realized that both formal and informal loans matter in agriculture. They found that formal lenders provide many more production loans than informal lenders, often at a cost (mostly loan default cost) higher than what they can recover. When focusing on the Agricultural Development Bank of Pakistan (ADBP), they found that ADBP provides about 90% of formal loans in rural areas. The government of Pakistan supports the formal scheme on the grounds that lending to agriculture is a high risk activity because of covariate risk. While using Rural Financial Markets Studies (RFMS) in rural Pakistan, they estimated the effectiveness of ADBP as credit delivery institution. The results revealed that ADBP contributes to household welfare and that its impact is higher for smallholder farmers than for large holders. ADBP was found to be not cost effective institution in delivering rural

finance. Its cost effectiveness can be improved by reducing its loan default and by partially targeting smallholders in agriculture where credit yields better results.

#### **2.4 Impact of credit on smallholder farmers' livelihoods**

Studies that used the livelihood framework have employed both qualitative and quantitative research components (Ponte, 2002 and Rutasitara, 2002). The qualitative component is regarded as appropriate for addressing social and institutional context of people's livelihoods and changing livelihood circumstances at community level. The quantitative component on the other hand, addresses assets, activities, and income and vulnerability factors at household level. Population pressure and the ensuing expansion of agriculture to more marginal land, intensification of the home garden system, together with climate changes affecting the water supplies, have caused changes in farmers' livelihoods (Soini, 2005). In the study of land use changes patterns and livelihood dynamics on the slopes of Mt. Kilimanjaro in Tanzania, Soini (2005) reported that as land scarcity hinders expansion of agriculture, farm size seriously decreased, common resources have become scarce, and prices of coffee in the world market remain low, farmers are trying to intensify and diversify their farm production.

Quinn *et al.* (2003) when examining the variation in local perceptions of risk in semi-arid Tanzania identified factors that influence local perceptions of problems and testing the feasibility of risk mapping as a technique. They found that most problems were associated with the availability of natural resources on which livelihoods depend but others to human and social capital assets. In addition to environmental factors, livelihood strategy and gender both influenced peoples' perceptions of risk. Problems of irrigation and weather, for example, were important for agricultural communities while problems relating to livestock diseases, access to land and water were more important in pastoral communities.

Moreover, Mahmoud and Shively (2004) showed that access to Integrated Pest Management (IPM) technology and IPM availability combined with access to credit increase household welfare and lead to higher rates of vegetable adoption.

Within rural communities different individuals possess different potential access to alternative activities and therefore different income sources (i.e. farm income, off-farm income and nonfarm income), conveying varying impacts on poverty and income distribution. Total household income is disaggregated into different categories of income sources or activities, which reflect features of resources required to generate them, their seasonality accessibility to them depending on assets and skills, and their location either nearby or remote (Ellis and Mdoe, 2003).

In rural areas of Ethiopia, women do most of the household and farm work such as keeping livestock, growing crops, and preparing or cooking food for family members. They are, however, economically less empowered and often do not have access to resources. In the study aiming at determining the effect of the goat credit project on women farmers' welfare through a credit-in-kind approach, Tefera (2007) observed that as a result, they acquired assets and diversified their livelihoods by purchasing and raising poultry, cows, oxen, and donkeys. The women farmers became more economically empowered, which enabled them to gain greater control over their resources, which in turn increased their capacity to participate in social activities and household decision making. The goat credit project brought about substantial changes by enhancing food security and diversifying the livelihoods of women farmers.



## 2.5 Impact of credit on the use of modern agricultural inputs

Dadi *et al.* (2004), used duration analysis to examine the impact of time-varying and time invariant variables on the speed of adoption of fertilizer and herbicide by smallholder farmers in East and West Shewa in Central highlands of Ethiopia. In that study the estimated models suggested that economic incentives (i.e. prices) were the most important determinants for the farmers to adopt new technologies. They also found that traction power in the form of oxen and infrastructural factors (in particular proximity to markets) appear to have been important influences, but less so than prices. Other agricultural inputs such as area of farm land, labour and credit, extension services and farmers' personal characteristics (education, gender and age) appeared to have influence on adoption behaviour of modern agricultural inputs use. Abdulai and Huffman (2005) reported that farmers adoption of crossbred technology depend positively on the proximity of his farm to other users, on his schooling and on his access to credit.

Mugisha *et al.* (2004) also found that adoption of IPM in groundnut production technologies was significantly influenced by education, household income, extension visit, access to credit and size of cultivated land. Moreover, Tripathi and Chandra (1994) when estimating the variation in the productivity of short-term crop credit in the three zones of Uttar Pradesh hill region and examining the productivity of rain fed wheat grown under credit and non-credit facilities reported that the use of inputs was higher on borrower farms than non-borrower farms.

Bahamondes (2003) used household surveys of three farming communities in Chile to illustrate how income from nonfarm employment and government credit programmes permitted agricultural intensification that allowed environmental recovery of fragile and common lands. The study examined household asset levels, how asset levels affect the

choice of agricultural practices and how those practices affected natural resource status. In that study he found that human capital, physical capital in the form of land and livestock, access to non farm employment, and access to agricultural credit and technical advice largely explain the adoption of irrigated forage production and woodlot planning with resultant increases in vegetative cover.

Provision and adoption of credit for fertilizer, although risky in itself, may lead to increased grain production and improved household welfare and food security. Provision of credit may have a negative effect on conservation incentives but this effect may be mitigated by linking a conservation requirement to the provision of credit for fertilizer (Holden and Shiferaw, 2004). Furthermore, Sjah *et al.* (2003) reported that agricultural credit enabled farmers to implement better husbandry practices, through applying more agricultural inputs (seeds, fertilizers, pesticides, crop maintenance) and through timely husbandry application.

Sarap and Vashist (1994) found that the adoption rate, degree of adoption and intensity of adoption to be significantly influenced by borrowings. They concluded that the diffusion of modern technology can be improved through the provision of adequate and timely credit. This was discovered when they were analyzing the characteristics of farm households which influence the decision to adopt modern varieties of rice, the degree of adoption (measured by the proportions of land under modern varieties) and the intensity of adoption (measured by the amount of modern inputs used per acre).

Wealth of an individual is argued to provide security, economic power and freedom to maneuver his or her resources (Mishra *et al.*, 2003). Wealth status on the other side plays a significant role in decisions to engage in new innovations (Ofei, 2003). Farmers who

believe their wealth is high are more likely to be engaged in new innovations that seem to nourish their productive activities and hence require credit. On the contrary, those who feel their wealth is low might be uncertain to engage in risky financial businesses (Ofei, 2003).

Research and technologies are strongly linked to the asset base. The best-researched aspects of this relationship are the types of assets that are required to adopt new technologies. For example, much of the debate on the Green Revolution centered on whether or not large landholdings (natural capital) were required to adopt the various components of the green revolution package. Considerable policy emphasis has also been given to expanding agricultural credit (financial capital) and roads or transportation (physical capital) in order to permit technology adoption. Human capital, in the form of knowledge and skills, is often required to properly make use of many new technologies intervention (Adato and Meinzen-Dick, 2002).

It is now increasingly recognized that social capital can facilitate adoption of technologies that operate on a large spatial scale, wherein collective action is needed to coordinate the action of individuals for common investment or adherence to rules. The framework requires researchers to think holistically, not just about certain types of assets such as land and credit, but also about the potential interaction of five or six kinds of assets, and the complementarities between assets and their sequencing. For example, membership in a social group (social capital) may be necessary for access to rights (political capital) and land (natural capital), which is necessary for access to credit (financial capital), which, in turn, is needed to purchase inputs to take advantage of a new technology. This understanding may lead to a different choice of intervention (Adato and Meinzen-Dick, 2002).

## **2.6 Socio-economic factors which determine the use of credit by smallholder farmers**

Rahman (2003) while studying farm-level pesticide use in Bangladesh found that among the socio-economic use variables, land ownership and agricultural credit are positively related to pesticide usage. Rweyemamu *et al.* (2005) found that transaction costs are significant determinants of the demand for credit and cause farmers to borrow less. Long disbursement periods are also a disincentive to borrowing and farmers with high expenditures tend to borrow more. The same applies to farmers with greater farming experience and those with high income.

The study carried out in Punjab focused on identifying the characteristics that distinguish commercial bank and cooperative sector borrowers. The differences in characteristics were discussed in terms of land ownership, ownership of capital assets, farm expenditure, technology adoption, ownership of financial and other assets and nonfarm and subsidiary agricultural employment. It was revealed that cooperative borrowers are mainly small and marginal farmers with limited land and capital. Bank borrowers on the other hand, were mainly commercial farmers who owned larger landholdings and higher amount of capital (Satish, 2005).

In Southern Sri Lanka, data were obtained from three location-based categories such as semi-urban areas, rural groups and the poorer more remote semi-irrigated and rain fed areas. Poor clients face geographic, financial and socio-cultural barriers to entry to the most promising micro-enterprise occupations, leading them to select low-value activities with poor growth prospects. In semi-urban areas, poverty impacts could be strengthened by supplementing loans with non-financial interventions encouraging poor clients to select high value occupations. In arid rural areas, where micro-enterprises face severe market and

infrastructure constraints, micro-enterprises development is unlikely to facilitate poverty exit (Shaw, 2004).

Okunade (2007) in his study on accessibility of agricultural credit and inputs to women framers of Isoya Rural Development Project (IRDP) came up with the result which implied that people who own landed properties have more access to credit facilities because they are able to fulfill the collateral security demanded before loan is granted. On the other side, Boucher *et al.* (2007) developed a model that showed that asymmetric information can result in two types of credit rationing: conventional quantity rationing, and "risk rationing," whereby farmers are able to borrow but only under high-collateral contracts that offer them lower expected well-being than a safe, subsistence activity.

After exploring its incidence with respect to wealth, Boucher *et al.* (2007) reported that risk rationing had important policy implications. Specifically, land titling is only partially effective because it does not enhance producers' willingness to offer up the collateral needed to secure loans under moral hazard constraints. Efforts to enhance agricultural investment and the working of agricultural credit markets must step beyond land titling and also deal with risk.

Also Okunade (2007) reported that a well literate person is able to put the loan into good use to enjoy maximum profit on any venture having direct relationship between occupation and accessibility. However, Okunade (2007) and Gockowski and Ndoumbe (2004) reported that there are variables which have negative relationship with for example age, the higher the age the less access to credit. This means older people may not be granted access to loan because they are no more agile to be able to cope with rigours of farming and hence the loans may be diverted to other uses other than farming business. Oni *et al.* (2005) after

observing the socio-economic characteristics of the respondents, found that majority of the poultry farmers were educated and that nearly all of the respondents were in their active working age. Results also made the study to conclude that the level of farmers education, farmer's income, age of the farmers and flock size significantly influenced the poultry farmers to delay in loan repayment.

Moreover, Hamadou (2003) found that education is the other deciding factor in the use of manure when he was assessing the socioeconomic factors influencing the use of manure in agricultural and mixed livestock production systems in Niger in two projects funded by IFAD. He therefore recommended that IFAD projects should include literacy activities, as well as a credit scheme allowing vulnerable farmers to acquire carts and draught animals when necessary. On the other hand, Asfaw and Admassie (2004) reported that there is a substantial and statistically significant intra-household spill-over effect of education on the adoption decision.

Okike *et al.* (2005) in the analyses of a survey which involved farming households in Nigeria reported that the degree of intensification was higher in the Sudan savanna than the Northern Guinea savanna. Intensification was occurring mostly through higher land and labor use intensity, higher livestock stocking rates and application of more manure per hectare. It was concluded that policies to enhance market access will facilitate the process and that different technological options need to be pursued in the two agro ecological zones to facilitate intensification).

In order to see whether there is a relationship between the credit use of the producers and the socio-economic factors claimed to be affecting credit use, in the test carried out by Kizilaslan (2007), it was found that the relationship between the level of expertise and rate

of market orientedness was statistically meaningful. Furthermore, in order to decide whether there is a difference in terms of some economic characteristics thought to be affecting credit usage, agricultural income, agricultural production annual sales cost and total gross production value were significant. Only the difference between the business concern width groups and the credit usage groups was found out to be significant.

Farmers who use hired labour are expected to require more capital than those who use family labour. Labour charges are higher especially during periods of peak labour demand. Farmers who use hired labour need more cash than those who use family labour, hence needs for credit are important for farmers who use hired labour. On the other hand, Enete *et al.* (2005) and Matshe and Young (2004) found the importance of individual characteristics (such as age, gender and formal education) and household or farm characteristics (e.g. the size of the household farm, productive assets, remittances and the agricultural terms of trade) in influencing the labour market decisions of rural household members.

## **2.7 Impact of credit on agricultural production and farmers' income**

Many government credit schemes have been provided to agricultural producers for the purposes of increasing production and farmers' income. For the case of Indonesia, national historical records show increasing agricultural credit provision by government, yet farmers seem to be unable to escape poverty. In addition, the repayment of credit has tended to be lower as years proceed. Sjah *et al.* (2003) reported that Indonesian experience has shown that the provision of agricultural credit has not improved agricultural production or farmers' incomes. As an indication, rice production dropped from 51.1 million tons in 1996/1997 when farm credit was provided to 48.7 million tons in 1998/1999. Furthermore, Sjah *et al.* (2003) reported that a significant amount of the credit was not repaid, and the

amounts in arrears tended to increase as years proceeded. In the 1970s there was about 80% repayment nationally whereas in 1998 to 2000 the repayment rate was only about 30%.

Iqbal *et al.* (2003) found the relationship between institutional credit and agricultural GDP to be positive and significant, also availability of irrigation water and agricultural labour per cultivated hectare, and cropping intensity to be the other important determinants of agricultural GDP. The investigation of credit access and its effects suggests that the presence of credit market constraints does impinge significantly on farm profitability (Foltz, 2004).

The study which was conducted by Fayaz *et al.* (2006) in Pakistan to examine the utilization and effects of short-term credit from Zarai Taraqati Bank Ltd (ZTBL) at Tehsil Kabal area, used paired sample t-test to compare the production and income of the beneficiaries without credit and with credit. It was reported that credit plays a crucial role in facilitating the modernization of agriculture and raising the participation of small farmers in the production process. The study concluded that ZTBL credit scheme had positive effect on crop production and income of growers and it is likely to be an effective tool for development of agriculture provided the distribution of credit is made with justice and the procedures are made easy. Moreover, Tripathi and Chandra (1994) found that credit had a favourable impact on crop returns, and thus provision of short-term credit is an effective way of increasing farm returns.

In one of the study, Satapathy and Tripathy (2001) noted that the borrowers had used higher amounts of critical inputs that enabled them to obtain higher per hectare yield compared to non-borrowers. Both borrowed and owned funds can be used in rice



production with regard to optimization of resources, credit recipients could get maximum profit from rice production through optimum use of credit financed inputs. Contrary Pender *et al.* (2004) found that there was little evidence of impact of access to markets, roads and credit, land tenure or title on agricultural intensification and crop production.

## **2.8 Methods and approaches used to measure economic impact**

In attempts to measure economic impact, different approaches have been used, in principle two main approaches are identified: before and after approach and with and without approach. In the group - based financial institution in Bangladesh Zeller (1994) reported that it is impossible to observe a household “before and after” program participation simultaneously due to lack of panel data set that allows observation of household before and after program participation. Following the above reasoning, they employed impact analysis by comparing household outcomes differentiated by access to credit (with and without credit) while simultaneously controlling for various other factors that affect the outcome (e.g. level of prior owned human and physical capital).

Descriptive studies on credit have been used in assessing the impact of credit through comparisons of farm inputs, production and productivity or with and without credit (Kashuliza, 1986). Studies that used the livelihood framework have employed both qualitative and quantitative research components (Ponte, 2002 and Rutasitara, 2002). The qualitative component is regarded as appropriate for addressing social and institutional context of people’s livelihoods and changing livelihood circumstances at community level. The quantitative component on the other hand, addresses assets, activities, and income and vulnerability factors at household level. According to Rutasitara (2002), quantitative information on household income and wealth in the form of assets, land and capital are useful in addressing livelihood patterns.

Chi-square is non-parametric test of statistical significance for bivariate tabular analysis. Bivariate tabular analysis is used when you are trying to summarize the intersections of independent and dependent variables and understand the relationship between those variables (Linton, 2001). That is why Chi-square is used to determine whether there is a significant difference between two groups. For example, Mlambiti and Isinika (1999) used Chi-square to determine whether there was a significant difference between farmers with and without credit in terms of adoption of wheat technologies such as fertilizer, herbicides, improved seeds and cultural practices.

In order to determine which variables discriminate between two or more naturally occurring groups, discriminant function analysis is used (Green and Salkind, 2000). For example, Temu *et al.* (2001) used discriminant analysis to test significant difference in terms of farm input use, farm output and income between borrowers and non-borrowers. The canonical discriminant function is a linear combination of the discriminant variables that are formed to satisfy certain conditions (Mwachang'a, 2000). Canonical discriminant coefficients maximize the ratio between groups and within groups' sum of squares. If there is any difference it is then expected that the two groups must differ in D score (Mwachang'a, 2000, and Temu *et al.*, 2001).

## **CHAPTER THREE**

### **3.0 METHODOLOGY**

#### **3.1 Theoretical and conceptual framework**

##### **3.1.1 Theoretical framework**

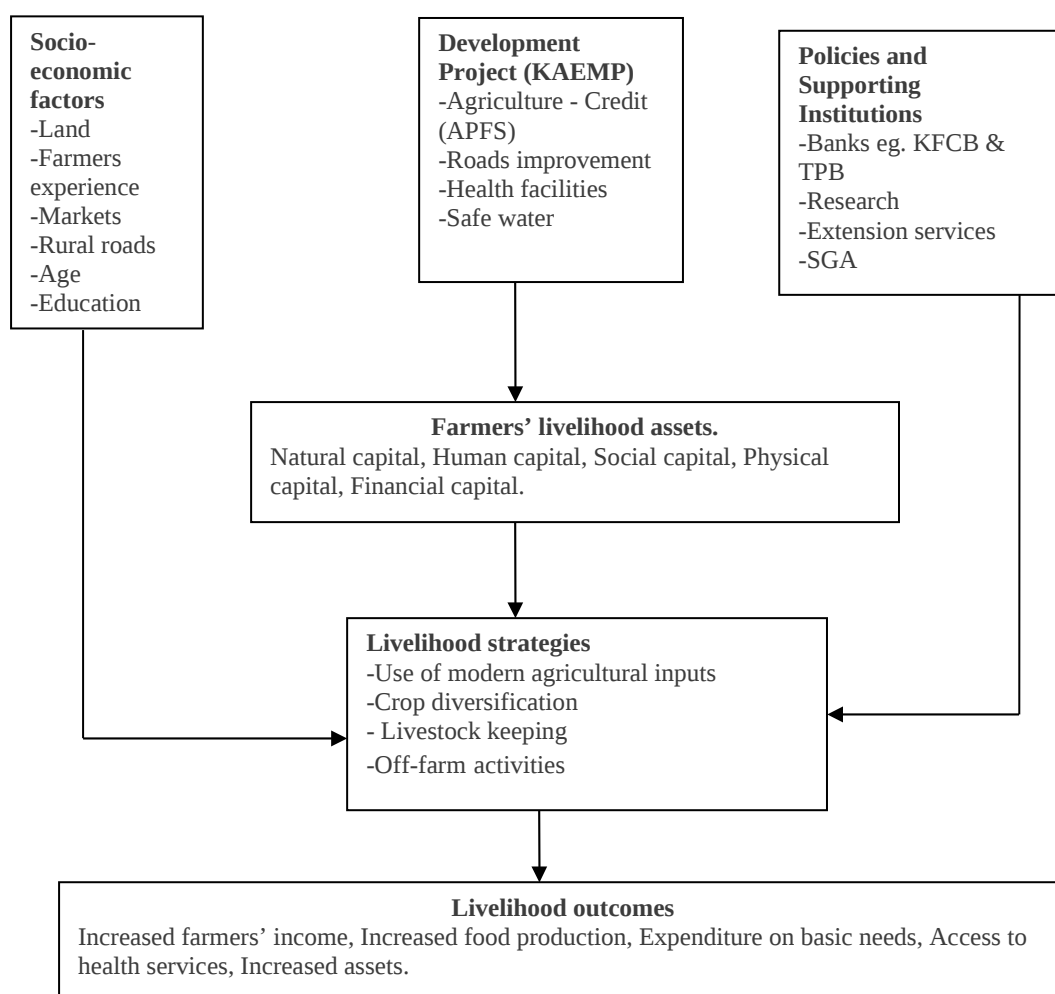
There have been different arguments as far as the role of financial sector in economic growth is concerned. It has been suggested that the financial sector leads and enhances economic growth (Levine, 1997). The rationale behind this argument is that financial intermediation facilitates the accumulation of monetary assets, enhances efficiency in resource allocation and the productivity of factor inputs. Therefore, fiscal deepening in the form of smoothly functioning credit markets is a prerequisite for economic development (Kayunze and Twamala, 2001). However, some economists argue that economic growth and financial development are jointly determined while others assert that the financial sector hurts economic growth (Woller and Woodworth, 2001).

Agriculture, like all sectors of the economy, needs credit for its development. The motives behind government programs to provide directed credit to agriculture can be traced to problems of asymmetric information in capital markets and, consequently, to benefits from relaxing the constraints on financing. In agriculture, directed credit programs that help farmers accumulate sufficient wealth to own land they cultivate may improve the allocation of resources. Whether government intervention in credit markets can achieve legitimate objectives depends on the mechanism chosen to implement directed credit (Calomiris and Himmelberg, 1994). Furthermore, the theory and methods used to analyze the market, management and policy elements of agricultural finance draw substantially on modern finance concepts, but with significant tailoring to the unique characteristics of agricultural sectors throughout the world (Barry and Robison, 2001).

There is no lending without financial resources. Loan to agriculture can be financed by different sources of funds such as farmer household savings, capital markets, equity, and budget allocations from the government, central bank refinance and international borrowing (Giehler, 1999). It is stipulated in the Keynesian theory that, demand for money is influenced by certain motives; one of these motives is transaction. Transaction motive arises from the fact that people need money to finance current transactions. Individuals and firms hold money to bridge the gap between the receipt and expenditures of income. In this context of financial intermediation, rural financial markets in developing countries consist of various intermediaries such agricultural development banks, commercial banks, rural unit banks, co-operatives, NGOs, informal financial institutions and individual money lenders (Giehler, 1999).

### **3.1.2 Conceptual framework**

Figure 1 depicts the conceptual framework that displays a diagrammatical presentation of the relationship existing between the variables used in the present study. The framework focused on how agricultural development project/scheme (KAEMP/APFS) is related to farmers' livelihood assets, livelihood strategies and finally livelihood outcomes. On the other hand, socio-economic factors (land, markets, farmers experience and roads) and supporting institutions (banks e.g. KFCB and TPB) have a direct link to farmers' livelihood strategies and hence livelihood outcomes.



**Figure 1: Conceptual framework of the study**

**Source:** Adopted and modified from CARE, 1995

Sustainable livelihoods (SL) thinking gained ground in the Department for International Development (DFID) poverty reduction efforts in the 1990s. The guiding assumption of the DFID approach is that people pursue a range of livelihood outcomes by which they hope to improve or increase their livelihood assets and to reduce their vulnerability (DFID, 1999).

The five types of assets that form the core of livelihood resources in the DFID SL framework range from natural, physical, financial, human to social capital. These

constitute the actual building blocks for livelihoods. In a recent extension to the DFID SL framework, political capital has been added (DFID, 1999).

Natural capital includes land, water, forests, marine resources, air quality, and erosion protection and biodiversity. Physical capital includes transportation, roads, buildings, shelter, and water supply and sanitation, energy, technology, or communications. Financial capital includes savings (cash as well as liquid assets), credit (formal and informal), as well as inflows (state transfers and remittances). Human capital includes education, skills, knowledge, health, nutrition, and labor power. Social capital includes any networks that increase trust, ability to work together, access to opportunities, reciprocity; informal safety nets; and membership in organizations.

Though most versions of the sustainable livelihoods framework are limited to these five kinds of capital as mentioned above, some add political capital as a sixth type of asset, which can include, for example, citizenship, enfranchisement, and membership in political parties—all assets that can be key in obtaining or operationalizing rights over other assets.

Policies, institutions, and processes affect how people use their assets in pursuit of different livelihood strategies. This box on the diagram refers to both formal and informal institutions and organizations that shape livelihoods by influencing access to assets, livelihood strategies, vulnerability, and terms of exchange. They may occur at multiple levels, from the household to community, national, and even global levels. The public and private sectors, civil society, and community institutions may all be relevant considerations; laws as well as culture can also be included. All of these influence people's livelihood strategies, i.e. the choices they employ in pursuit of income, security, well-being, and other productive and reproductive goals.

Traditionally, income levels have been used to explain well-being of individuals in the world. Today, apart from income of an individual, expenditure on basic needs, accesses to health services and increased assets are used to explain well-being of an individual.

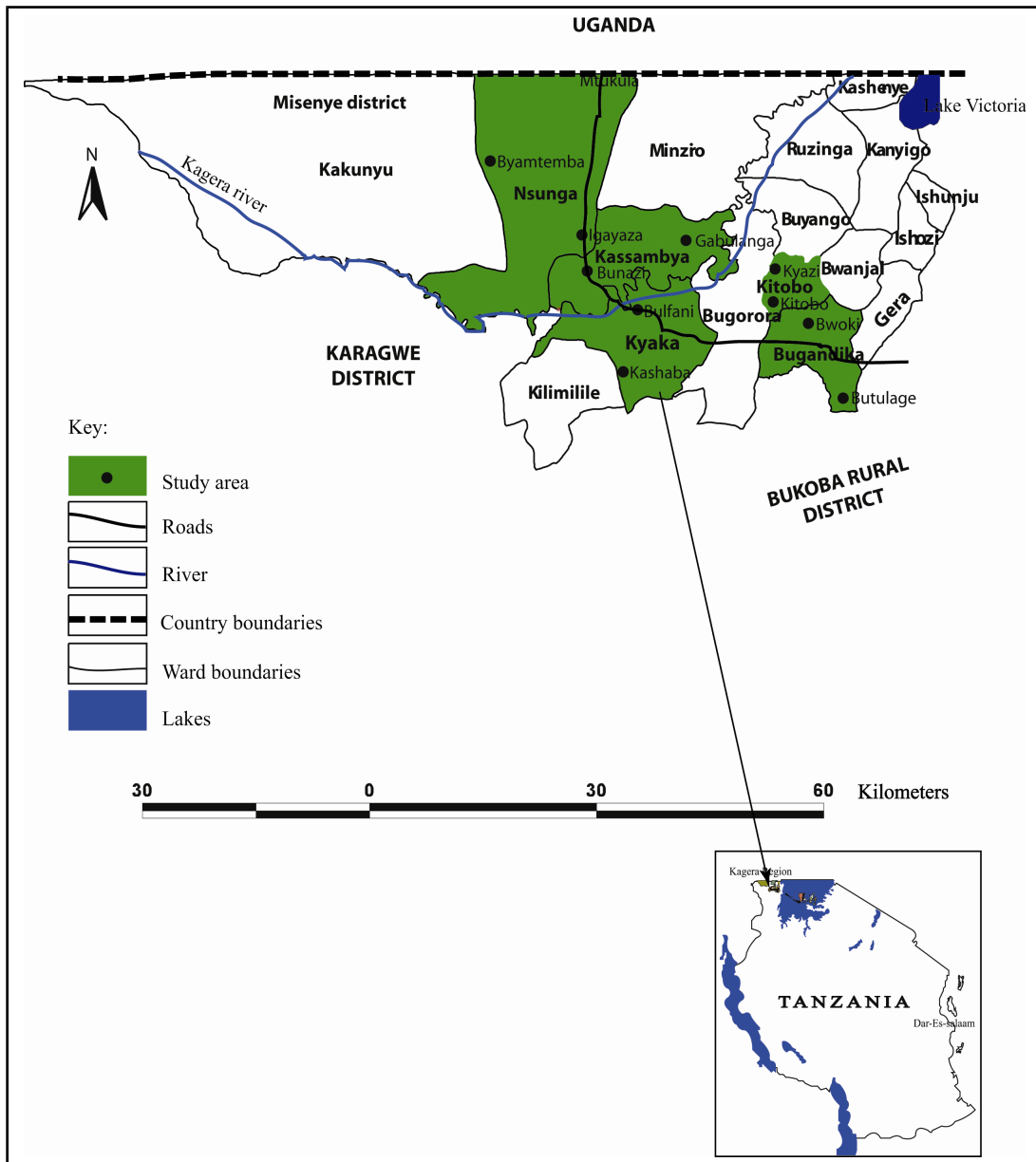
## **3.2 Location and characteristics of the study area**

### **3.2.1 Location**

The study was conducted in Misenye district<sup>2</sup> in Kagera region. Misenye district is one of the eight administrative districts comprising the Kagera region. Other districts are Bukoba rural, Bukoba urban, Muleba, Karagwe, Biharamulo, Chato and Ngara. The district was chosen because the project started providing credits in this area in 2002 before other districts came in. The district covers a total area of 270 875 ha of land. On the Northern side, Misenye district is bordering Uganda, on the East it borders the Lake Victoria and Bukoba rural district, on the South it borders Bukoba rural district and on the West Karagwe district. The district is composed of two divisions subdivided into 17 wards (see Figure 2).

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<sup>2</sup> Until 2006 was part of Bukoba rural district



**Figure 2: A map of Misenyé district showing a study area**



### **3.2.2 Farming systems**

The district is predominantly agricultural. Cropping system is mainly rain fed and dominated by banana plantain intercropped with coffee, maize and beans. Some few cassava and sweet potatoes are also part of the cropping system. There is little vegetable production. However, recently cabbage and tomato are becoming important vegetables in the farming system. The majority of the farms are less than 2 ha.

Most important food crop is banana mixed with beans and these days maize is also used as a food crop in most households. These two crops are increasingly becoming important as commercial crops in most domestic markets. The processing of beer from bananas is an important agro-processing activity in the rural areas. Output of banana production is falling due to the declining fertility of the soils and the attacks of pests and diseases such as Fusarium Wilt (Panama disease), banana weevils and nematodes. Coffee, mainly the Robusta type, is grown by almost all households. Coffee was the only commercial crop that fetched external market but due to drop in the world market price, the crop has now been receiving less attention by farmers. Vanilla has also been introduced recently and some farmers have now shown interest due to its higher price compared to coffee.

Dairy cattle, introduced by Kagera Livestock Development Project (KALIDEP) are an important part of the farming system and rural income. The natural grasslands are used by indigenous cattle for grazing. This type of cattle is mainly kept to provide manure, which is often sold in the villages to enhance agricultural productivity.

### **3.2.3 Human population and infrastructure**

The population census of 2002 showed that the two divisions of Misenye and Kiziba which comprise of what is now known as Misenye district had a population of 152 842 people

with 35 694 households with the average size of 4.3 people per household (URT, 2003). There is a rather dense road network and a moderately well maintained roads (earth roads, gravel roads and tarmac roads) linking Misenye district to other districts in the region and neighbouring Uganda in the northern part of the district.

#### **3.2.4 Climate and topography**

The district receives bimodal rainfall pattern between October and November (short rains) and March and May (long rains). An average rainfall ranges between 600 – 2000 mm a year. The highland belt which is mainly Kiziba division gets between 1000 – 1400 mm of rain a year while the western zone gets between 600 – 1000 mm of rain a year. An average temperature is 20°C with minimum and maximum extremes of 15°C and 28°C respectively. A considerable part of the district is of high altitude (1400 m above sea level) with several streams flowing into the Kagera and Ngonzo rivers ultimately into Lake Victoria. The soils are predominantly ferrasols, greysols, arenosols and vertisols. But the ferrasols are the most important soils in the district. These soils are, however, highly reached and of low fertility (Rugalema, 1994).

#### **3.2.5 Economic activities**

In the focus of Kagera region (Quarterly Economic Review), agricultural production is reported as the most important economic activity contributing about 50% to the region's Gross Domestic Product (GDP). It is estimated that about 96% of the region's population derives its livelihood from agricultural production and livestock keeping (ESRF, 2002). Agriculture is carried out mostly under smallholder farming, since there is very little commercial farming. These estimates can be used to explain the livelihood of Misenye district. Non-agriculture employment opportunities are rather limited but there are off-farm income generating activities. These are fishing in Lake Victoria, clay brick making, pit and

machine sawing, masonry, tailoring, carpentry and petty businesses. Villages along the shores of Lake Victoria are involved in fisheries activities as a very important supplement to cash income and the daily diet. The Kagera Sugar Company and nowadays the Miseny District Council are the institutions which offer sizeable off-farm employment. The major differences in wealth, living conditions and status between households in the rural areas are explained by ownership of cattle, the size of the family, educational status, access to farmland and the family and farm development cycle in general.

Construction of houses and all kinds of informal sector activities (carpentry, welding, plumbing, car repairs and unskilled labour) provide additional employment and income and attract mainly young people. More maize-milling machines have been installed being a clear sign of changing food production and eating habits of the population. Most processing is done in the informal sector (fish, local brew) which constitutes an important sector for providing (temporary) jobs and income.

### **3.3 Research design**

The research design used was a cross-sectional survey done at a single point in time. A cross-sectional survey is useful in obtaining quantitative information and the method is suitable for a descriptive study as well as for determination of relationship between and among variables (Bailey, 1998). Since this is an impact study, an approach known as with and without was used i.e. farmers who received credit and those who did not receive.

### **3.3.1 Sampling procedure**

#### **3.3.1.1 Population**

The population of the study consisted of smallholder farmers of selected wards of Nsunga, Kassambya and Kyaka in Misenye division and Bugandika and Kitobo in Kiziba division including those with and those without credit under the project which was studied.

#### **3.3.1.2 Sampling and sample size**

Both divisions (Misenye and Kiziba) in Misenye district were taken purposively. From the two divisions five wards were selected. Three wards were selected from Misenye division i.e. Nsunga, Kassambya and Kyaka. Two wards were selected from Kiziba division i.e. Bugandika and Kitobo. The selection of wards based on the agricultural potential in these selected areas. Purposive sampling was used to select two villages from each ward; one village was the one with easy accessibility while the other was the one with difficult accessibility. A stratified random sampling technique was then used to group smallholder farmers into groups of those who are receiving credit and those who are not receiving credit at village level. In each stratum, simple random sampling procedure was used to draw the sample of 12 farmers from each village making a total of 120 farmers which formed a sample for this study. This sample size was reported by Matata *et al.* (2001), who contended that 80 – 120 respondents are adequate for most socio-economic studies in Sub-Saharan Africa (SSA).

**Table 2: Respondents' selection**

Division	Ward	Village	Sex		Total
			Male	Female	
Misenye	Nsunga	Byamtemba	9	3	12
		Igayaza	8	4	12
	Kassambya	Bunazi	8	4	12
		Gabulanga	9	3	12
	Kyaka	Bulfani	7	5	12
		Kashaba	7	5	12
Kiziba	Bugandika	Butulage	8	4	12
		Bwoki	9	3	12
	Kitobo	Kitobo	9	3	12
		Kyazi	11	1	12
Total			85	35	120

### 3.3.1.3 Data source and collection procedure

Both primary and secondary data were collected. The main source for primary data was the smallholder farmers with and without credit from the five wards. Secondary data were collected from various sources; libraries, internet, government documentation, research works, reports and other available materials relevant for the study to supplement the primary data. The two structured questionnaires were developed with close and open ended questions aiming at collecting both quantitative and qualitative data (Appendices 1 and 2). After developing the instrument, pre-testing of the two questionnaires was conducted under field conditions in order to check their relevance and comprehensiveness in gathering required information.

### 3.4 Data processing and analysis

The data collected were analyzed by using Statistical Package for Social Sciences programme (SPSS). Guided by the specific objectives set before, a number of analytical methods were used in this study as described below.

### 3.4.1 Descriptive analysis

Descriptive analysis undertaken in this study involved a number of descriptive statistics, parametric and non-parametric tests. Descriptive statistics such as frequencies, means, standard deviations, percentage and cross tabulation was used to summarize the information and compare different variables between the two groups. Parametric analysis used was independent t-test while non-parametric analysis used was chi-square.

The hypothesis that there is no significant difference in the use of improved agricultural inputs between borrowers and non-borrowers of credit from KAEMP was tested by using Chi- square which was used based on the assumption of independence to calculate the expected counts. The expected counts were then compared to the observed ones to test if an association exists between acquiring credit and the use of improved agricultural inputs. Chi-square test was also employed to test if there is no significant difference in value of farm tools and equipment, farm labour, access to health services and type of livestock owned between borrowers and non-borrowers.

The mathematical form of Chi-square is as follows:

$$\chi^2 = \sum \frac{(fo - ft)^2}{ft}$$

Where:

$\chi^2$  = Chi-square statistics

$\Sigma$  = Summation sign

fo = an observed frequency

ft = expected/theoretical frequency

In the analysis of livelihood changes resulting from the use credit, mean difference sample t-test was employed by using the number of labourers used on the farm, farm area cultivated, household size, and value of household assets. In order to make a comparison on income status between borrowers and non-borrowers, mean comparison analysis was employed in order to compare estimated income from both farm and off-farm activities between borrowers and non-borrowers.

### 3.4.2 Multivariate Discriminant Analysis

In order to determine socio-economic factors within the project environment which influence use of credit by smallholder farmers, Multivariate Discriminant Analysis (MDA) was used. MDA was chosen because it is a useful tool for building a predictive model of the group membership based on the observed characteristics of each case (Green and Salkind, 2000). Its generation is based on linear combinations of the predictor variables which provide the best discrimination between groups (SPSS, 1999). The mathematical form (also see Lawler, 2006) of the estimated linear discriminant function was as follows:

$$D = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + \dots + B_nX_n$$

Where:

D = a score or value of the canonical discriminant function

$B_i$  = Canonical coefficients for independent variables in the function

$X_i$  = Discriminant or independent variables

$B_0$  = intercept

n = number of independent variables

The following socio-economic factors were used.

Age ( $X_1$ ), Household size ( $X_2$ ), Farm size (ha) ( $X_3$ ), Number of active family members ( $X_4$ ), Off-farm income ( $X_5$ ), Agricultural input expenditure ( $X_6$ ), and Assets value ( $X_7$ ). In order to adjust for unequal means and standard deviation and hence indicating the relative importance of the variables in the discriminant function, the canonical coefficients were standardized.

This standardization changed the above equation to:

$$W = B_1X_1 + B_2X_2 + B_3X_3 + \dots + B_nX_n$$

Where,  $W$  = is the discriminant score when the discriminant variables are standardized.

### **3.4.3 Limitation of the methodology**

Much of the primary information for the study was collected through interviewing respondents. The most limiting factor was reliance on the respondents to recall income obtained from crop and livestock production, expenditure on agricultural inputs and expenditure on basic needs such as clothing, education, health services and food. Thus, the results obtained were probably the minimum and they should be taken as estimates.

Reluctance of some respondents to be interviewed was another limiting factor. Such respondents demanded payments for being interviewed from the researcher and his assistant. Respondents who refused to be interviewed on grounds of being paid were discarded, i.e. they were not interviewed.



## **CHAPTER FOUR**

### **4.0 RESULTS AND DISCUSSION**

#### **4.1 Smallholder farmers' socio-economic characteristics**

##### **4.1.1 Household characteristics**

A summary of the socio-economic characteristics of the respondents in the study area is given in Table 3. The table mainly summarizes gender, age, education level, marital status and household size of the respondents for both borrowers and non-borrowers. In the present study, it was observed that the majority of the respondents were males i.e. 71.7% borrowers and 70.0% non-borrowers. Fewer females were included in the survey largely because the study area is characterized by male dominance, so this can be the case for the 28.3% female borrowers and 30.0% female non-borrowers of the interviewed respondents.

**Table 3: Socio-economic characteristics of the respondents**

Variable	Characteristics	Borrowers(n=60)		Non-borrowers (n=60)	
		Freq.	%	Freq.	%
Gender	Male	43	71.7	42	70.0
	Female	17	28.3	18	30.0
Educational level	Adult education	1	1.7	1	1.7
	Primary Education	34	56.7	50	83.3
	Post Primary Education	25	41.6	9	15.0
Marital status	Single	1	1.7	3	5.0
	Married	47	78.3	46	76.7
	Widow	11	18.3	10	16.7
	Divorced	1	1.7	1	1.7
Age of respondents <sup>1</sup>	20 - 35	7	11.7	16	26.7
	36 - 50	29	48.3	26	43.3
	>50	24	40.0	18	30.0
Household size <sup>2</sup>	2 - 5	13	21.7	27	45.0
	6 - 8	33	55.0	28	46.6
	>9	14	23.3	5	8.4

<sup>1</sup> Age of respondents: Minimum = 26 Maximum = 79 Mean = 46.01

<sup>2</sup> Household size: Minimum = 2 Maximum = 15 Mean = 6.54

In the context of theory and practice, education level plays a significant role in ensuring that households have access to basic needs of life. In addition, skills obtained from education are necessary in increasing working efficiency thereby giving chance to households to acquire more income. This study indicates that education was found to be higher for borrowers compared to non-borrowers. On one side, most of the non-borrowers (83.3%) had attained primary education compared to the borrowers (56%). The high literacy rate indicates that, most of the respondents know how to read and write. This high level of literacy rate might also be attributed by efforts made by the government in expanding primary education all over the country since independence.

On the other side, most of the borrowers who had attained secondary education and post-secondary education (41.6%) are higher than non-borrowers (15.0%). This considerable high rate of literacy is an important input which may enable local people to be aware, understand and adopt new technologies in farming more easily hence creating necessary strategies for improving their standard of living. The results show that a great number of the respondents were married i.e. 78.3% of the borrowers and 76.7% of the non-borrowers (Table 3). These results imply that large proportion of the respondents in the surveyed area were married and mature people, revealing the typical characteristic of many rural areas in Tanzania. It also shows that the society is stable. A stable family is more productive in that they concentrate more on production than unstable one (Msuya, 2003).

In this study, various age groups were captured (Table 3). The results show that most of the respondents were aged between 36 – 50 years and the mean age was 46.01 years. The mean and range of age is for both borrowers and non-borrowers. These are mature people who are still energetic and able to play a significance role as far as production processes are concerned.

The household composition which was considered in the surveyed area were the residential groups whose members live together in close contact by sharing resources held in common such as accommodation, farmland and foodstuffs. Table 3 shows that 21.7% of the borrowers had between two to five people, 55% had between six to eight and 23.3% had nine and above people; while 45% of the non-borrowers had between two to five people, 46.6% had between six to eight people and 5% had nine and above people. The overall average household size for borrowers and non-borrowers was 6.54 people.

#### 4.1.2 Source of income for household

Table 4 shows the major sources of income, off-farm businesses and sources of farm labour for the household in the study area. Major sources of income were sale of food crops, sale of cash crops, livestock keeping, wage employment and off-farm income generating activities. Off-farm income generating activity is one among several other livelihood strategies used by smallholder farmers in the study area. Due to the risks that might happen in agricultural production, farmers in the study area are involved in off-farm income generating activities such as fishing, clay brick making, pit and machine sawing, masonry, tailoring, carpentry and petty businesses. These off-farm income generating activities are meant either to buffer risks associated with agriculture and/or supplement the decreased income earned from agricultural production.

**Table 4: Major sources of income and sources of farm labour**

Characteristics	Borrowers (n=60)	Non-borrowers (n=60)	Total (N=120)
Major source of income (%)			
Sale of food crops	11.7	15.0	13.4
Sale of cash crops	20.0	33.3	26.7
Livestock	3.3	1.7	2.5
Wage employment	6.7	6.7	6.7
Off-farm business	58.3	43.3	50.8
Off-farm business (%)			
With	83.7	51.7	67.7
Without	16.3	48.3	32.3
Farm labour (%)			
Family labour	21.7	70.0	45.9
Hired labour	33.3	15.0	24.2
Family and hired labour	45.0	15.0	30.0

It was observed during this study that, most of the respondents i.e. 58.3% borrowers and 43.3% non-borrowers (Table 4) mentioned off-farm business to be their major source of income. Nevertheless, respondents mentioned that the allocation of capital resources to off-farm activities results into more considerable returns compared to when capital is allocated

to farming activities. The results in Table 4 indicate that 83.7% of the borrowers had off-farm businesses while the percentage of non-borrowers who had and who did not have off-farm businesses were almost the same 51.7% and 48.3% respectively.

It followed that a good number of borrowers (58.3%) mentioned off-farm businesses as their major source of income since it was one of the credit scheme condition to acquire credit. A few farmers depended on sale of livestock and its products, 3.3% for borrowers and 1.7% for non-borrowers (Table 4). The results suggest that many farmers consider livestock keeping as an alternative income generating activity especially when there is an emergency.

Economic state of an individual is one among the indicators for someone to make a choice of labour force for production. If the financial position of an individual is good, achievement of his/her goals becomes possible due to availability of resources. Results as seen in Table 4 show that borrowers used more hired labour than non-borrowers, i.e. 33.3% and 15% respectively. On the other hand, more non-borrowers used family labour (70%) than borrowers (21.7%). The implication of the results is that, borrowers are able to hire labour due to the opportunity they have of accessing credit for different agricultural activities. As it is also shown in Table 4, access to credit might be the reason for borrowers to engage in off-farm income generating activities and to hire labour in farms so that they get time to manage their off-farm businesses.

## **4.2 Credit information and performance**

### **4.2.1 Credit information on non-borrowers side**

Non-borrowers for this study included SGA members and non- SGA members while borrowers were all SGA members. The study revealed that, other than KAEMP; SACCOS,

NGOs, and other commercial banks are main sources of credit to small farmers. Table 5 shows that 92.9% of the non-borrowers who were SGA members were aware of the availability of credit in this scheme, while 39.1% of non-borrowers who were not members of SGA were aware of credit availability. Being an SGA member provided a great opportunity of getting information on the availability of credit from KAEMP. When non-borrowers were asked to give reasons for not taking credit, 60.9% non-SGA members responded that they were not aware about credit availability.

**Table 5: Credit information on non-borrowers side (n=60)**

Credit information	Membership of SGA			
	SGA members (n = 14)		Non-SGA members (n = 46)	
	Frequency	Percentage	Frequency	Percentage
<b>Awareness of credit availability</b>				
Aware	13	92.9	18	39.1
Not aware	1	7.1	28	60.9
<b>Reasons for not taking credit</b>				
Lack of security	0	0.0	1	2.2
Not aware of credit	0	0.0	28	60.9
High risk	1	7.1	15	32.7
Not needed	1	7.1	1	2.2
Applied for but not given	12	85.8	0	0.0
<b>Respondents taking credit from other sources</b>				
None	13	92.9	37	80.5
SACCOS	0	0.0	6	13.0
NGOs	1	7.1	2	4.3
Other sources	0	0.0	1	2.2
<b>Adequacy of credit in agriculture</b>				
Adequate	12	85.8	31	67.3
Not adequate			15	32.7

It was indicated that the majority of non-borrowers both SGA members and non-SGA members were not taking credit from any credit offering institution i.e. 92.9% and 80.5% respectively (Table 5). The implication is that most of the non-borrowers had no

experience in credit though many of them responded that agricultural credit is adequate for agricultural production i.e. 85.8% of SGA members and 67.3% of non-SGA members. Table 6 indicates that 63.3% of the borrowers had not taken credit from any credit offering institutions before joining this scheme and 20% had taken credit from commercial banks before.

#### **4.2.2 Credit information and performance on borrowers**

The task of delivering credits to farmers in the APFS was assigned to two banks namely Tanzanian Postal Bank (TPB); and Kagera Farmers Cooperative Bank (KFCB) starting from 2002. Before credit can be issued, potential borrowers have to fulfill the following requirements; first register themselves as members of SGA, applicant's engagement in agricultural production activities, ownership of a piece of land, existence of a project which is on going, a borrower must have any off-farm income generating activity so as to buffer any risk that might happen from agricultural production, maintenance of a savings account or any other convenient account with the bank (KFCB or TPB) and finally an applicant must be legally competent to borrow (attained the age of 18 or above).

According to the scheme, farmers were at liberty to take credit from either of the two banks. In the surveyed area, the respondents who were interviewed (65%) obtained credit from KFCB and the remaining obtained credit from TPB (Table 6). TPB halted to deliver credits due to high default rate it experienced that is why many farmers obtained credit from KFCB which is still delivering credits although it is also experiencing considerable default rate. Table 6 shows that in the surveyed area only 41.7% borrowers were in arrears while 58.3% were not in arrears.

**Table 6: Credit information and performance on borrowers (n=60)**

	Frequency	Percentage
Banks where respondents took credit		
TPB	18	30.0
KFCB	39	65.0
Both banks	3	5.0
Number of times a respondent has obtained credit		
1	37	56.7
2	22	36.7
3	3	5.0
4	1	1.7
Arrears		
In arrears	25	41.7
Not in arrears	35	58.3
Other credit sources used before joining the scheme		
None	38	63.3
SACCOS	6	10.0
NGOs	4	6.7
Other banks	12	20.0

It was observed that 83.3% of the non-borrowers were not taking credit from any credit offering institution (Table 5) while only 63.3% (Table 6) of the borrowers were the ones who had not taken credit before joining the scheme. This depicts the really situation existing in rural areas where very few people have access to credits. The situation does not seem to change much even after different projects have come in as far as credit delivering is concerned. This is revealed by the number of times farmers have taken credit (Table 6). Only 56.7% obtained credit once, 36.7% obtained credit twice, 5% obtained credit thrice and 1.7% managed to obtain credit four times.

There were complaints from the borrowers during the survey that the whole process up to loan disbursement stage takes a long time of about four to six months or more. This discourages borrowers and some decide to abandon taking credit any more; but this delay



of loan disbursement according to the loans officer in the visited area was due default of some borrowers in their self-elected groups. Since the loans were disbursed in groups, it was mandatory for the prospective borrowers to organize themselves into small groups of three people who are willing to guarantee each other. It is then necessary that for further loan to be advanced to borrowers no one among the three in the self-elected group should have any outstanding loan.

### **4.3 Socio-economic factors which influence the use of credit by smallholder farmers**

Socio-economic characteristics in most cases have been used to distinguish between borrowers and non-borrowers or between borrowers in different sectors. For example, the study which was carried out in Punjab focused on identifying the characteristics that distinguish commercial bank and cooperative sector borrowers. The differences in characteristics were discussed in terms of land ownership, ownership of capital assets, farm expenditure, technology adoption, and ownership of financial and other assets and non-farm and subsidiary agricultural employment (Satish, 2005). This study therefore, used the following socio-economic characteristics such as age of the respondent, household size, farm size, number of active members in the household of a respondent, income generated from off-farm activities, agricultural inputs expenditure and value of assets in the respondent's house.

#### **4.3.1 Age**

Age was thought to be a factor that might influence the use of credit because it is believed that the higher the age the less access to credit. Physical strength also depends on age therefore performance of economic activities can be influenced by age of the respondent. This means older people may not be granted access to loan because they are no more agile to be able to cope with rigours of farming and hence the loans may be diverted to other

uses other than farming business (Okunade, 2007; Gockowski and Ndoumbe, 2004). On the other hand, young farmers might not be involved in some activities due to lack of experience, less security and socio-economic circumstances (Yazdani and Gunjal, 1998).

#### **4.3.2 Household size**

Larger household size is believed to bear a burden to the household head or bread winner hence a decision of adopting credit as an alternative for producing more to feed household members may be opted. Moreover, large household size reflects higher demand for funds to meet family financial commitments (Yazdani and Gunjal, 1998; Vaessen, 2001). It was also suggested by Vaessen (2001) that, larger household size has adequate labour to take loan and repay back. Thus, household size was then anticipated to be one of the socio-economic factors that can discriminate borrowers and non-borrowers on the use of credit in this study.

#### **4.3.3 Farm size**

Farmers with larger farm areas have additional financial obligations due to risks and the scale of farm operations (Yazdani and Gunjal, 1998). In addition, Rahman (2003) while studying farm-level pesticide use in Bangladesh found that among the socio-economic use variables, land ownership and agricultural credit are positively related to pesticide usage. Hence farm size was included among the discriminating variables between borrowers and non-borrowers of credit.

#### **4.3.4 Number of active members in the household**

Active household members are the ones who are energetic and able to play a significant role in production processes. Therefore, healthy and productive members are important assets in household production activities. Rutasitara (2002) observed that children and the

old tend to be less active in economic activities than those in the middle age. Oni *et al.* (2005) after observing the socio-economic characteristics of the respondents, found that majority of the poultry farmers who obtained loan were nearly all in their active working age. Active members are therefore considered to be discriminating factor in the use of credit.

#### **4.3.5 Off-farm income**

In order to see whether there is a relationship between the credit use of the producers and the socio-economic factors claimed to be affecting credit use, in the test carried out by Kizilaslan (2007), it was found that income was significantly affecting credit usage. An argument which was given by Temu *et al.* (2001) emphasized that income from off-farm activities is expected to influence farmers' decisions on using financial services. Basing on the fact that off-farm activities are in most cases not seasonal, farmers with off-farm activities would likely have more and reliable income in comparison with those entirely depending on farming. Therefore off-farm income is hypothesized to influence the use of credit from KAEMP between borrowers and non-borrowers.

#### **4.3.6 Agricultural inputs expenditure**

It is argued that, credit availability may increase farmers' ability to utilize more productive inputs and hence increased productivity through technological changes (Yazdani and Gunjal, 1998; and Adato and Meinzen-Dick, 2002). Moreover, Tripathi and Chandra (1994) when estimating the variation in the productivity of short-term crop credit and examining the productivity of rain fed wheat grown under credit and non-credit facilities reported that the use of inputs was higher on borrower farms than non-borrower farms. In one of the study, Satapathy and Tripathy (2001) noted that the borrowers had used higher amounts of critical inputs that enabled them to obtain higher per hectare yield compared to

non-borrowers. Furthermore, Farmers who use improved seeds and other industrial agrochemicals require more cash to purchase inputs. Hence, cash spent on inputs can be one of the discriminating factors on the use of credit.

#### **4.3.7 Assets value in the household**

In most cases, assets are used as collateral for obtaining credit. In the identification of the characteristics that distinguish commercial bank and cooperative sector borrowers, Satish (2005) used differences in characteristics in terms of ownership of assets. Mwankemwa (2004) also reported that possession of high valued assets necessary for different livelihood strategies influenced the use of credit from SACCOS. Taking this into consideration, this variable was expected to discriminate borrowers and non-borrowers.

In order to determine socio-economic factors within the project environment which influence use of credit by smallholder farmers from KAEMP, Multivariate Discriminant Analysis (MDA) was used. MDA can be used to determine which variables are the best predictors. This kind of analysis is also a useful tool for building a predictive model of the group membership based on the observed characteristic of each case (Lawler, 2006). Its generation is based on linear combinations of the predictor variables which provide the best discrimination between groups (SPSS, 1999). The results in Table 7 show significant values and F-statistics which were obtained from a one-way ANOVA computed individually for each variable. F-statistic which is a ratio of between groups' variability and within groups variability was used since the present study used two groups i.e. borrowers and non-borrowers (SPSS, 1999). Four factors i.e. total household members, number of active household members, off-farm income and assets value; were found to be significant at 1% and 5% as indicated (Table 7).

**Table 7: Tests of equality of means with respect to household characteristics**

Discriminating variable	Wilks' Lambda	F	Significance
Age (X <sub>1</sub> )	0.975	3.047	0.084
Total household members (X <sub>2</sub> )	0.915	10.990	0.001**
Farm size (ha) (X <sub>3</sub> )	0.985	1.783	0.184
Number of active household members (X <sub>4</sub> )	0.911	11.473	0.001**
Off-farm income (X <sub>5</sub> )	0.921	10.120	0.002**
Agricultural input expenditure (X <sub>6</sub> )	0.989	1.328	0.252
Assets value (X <sub>7</sub> )	0.948	6.415	0.013*

\*\* - Significant at  $p < 0.01$ , \* - Significant at  $p < 0.05$

Then, the step-wise discriminant analysis was used so that the best discriminat variables are obtained. The most useful method in the step-wise discriminant analysis is the Wilks lambda method, which selects predictors that minimize Wilks lambda value. The analysis continues until no variable meets the criterion for removal and no variable meets the criterion for entry (Lawler, 2006). In order to determine the expediency of each variable in the discriminant function, the examination of variables structure matrix was carried out. Table 8 presents the structure matrix according to the suitability of each variable in the function. The factor structure coefficients are the correlations between the variables in the model and the discriminant functions.

**Table 8: Structure matrix showing the usefulness of each variable**

Discriminating variable	Function
Number of active household members	0.770
Off-farm income	0.723
Total household members <sup>a</sup>	0.579
Farm size <sup>a</sup>	0.496
Assets value <sup>a</sup>	0.455
Agricultural input expenditure <sup>a</sup>	0.367
Age <sup>a</sup>	0.116

<sup>a</sup> –variable not used in the analysis

The discriminant function coefficients denote the unique contribution of each variable to the discriminant function. Moreover, the functions are independent, that is, their contributions to the discrimination between groups cannot overlap. The first function picks

up the most variation; the second function picks up the greatest part of the unexplained variation and so on. The results presented in Table 8 show the factor structure matrix in a descending order according to the usefulness of each variable in the function. Thus, number of active household members and the income from off-farm income generating activities were the only variables which were found to be useful in discriminating the two groups i.e. borrowers and non-borrowers. The remaining variables were found not useful hence could not be included in further step-wise analysis, implying that they were not useful in discriminating the two groups.

The two variables i.e. number of active members in the family and off-farm income as seen in Table 9 were found to be discriminating the two groups i.e. borrowers and non-borrowers at 1% level of significance.

**Table 9: Discriminant function: Grand analysis results for number of active family members and off-farm income**

Parameter	Value of the whole sample
Eigenvalue	0.164
Canonical correlation coefficient	0.375
Wilks' Lambda	0.859
Chi-square value	17.779**

\*\* - Significant at 1% level of significance

The Eigenvalue which is the ratio of the between-groups sum of square to the within groups or error sum of squares is 0.164, the canonical correlation coefficient is 0.375 which measures the association between the discriminant score and the groups, the Wilks' lambda is 0.859 and the Chi-square value is 17.779. Among the seven factors which were assumed to discriminate borrowers and non-borrowers, only two factors have been found to be the best discriminators. The implication is that, a borrower with more active members in his/her household and involvement in off-farm income generating activities is in a good chance of obtaining credit from APFS.

Wilks' lambda is the proportion of the total variance in the discriminate scores not explained by differences among the groups (SPSS, 1999). Wilks' lambda is also used to test the null hypothesis that the populations have identical means and provide little information in the success of the model for classifying cases. The smaller the Wilks' lambda the more doubt cast upon that the populations are different. In this case Wilks' lambda of 0.859 indicates that 85.9% of the variance is not explained by group difference. This can be associated with the results that only two variables were found to be discriminating the two groups i.e. borrowers and non-borrowers while the rest of the variables were excluded from the analysis indicating that they are not significantly important in discriminating the two groups. Lambda was transformed to a variable with an approximate Chi-square distribution in order to test its size. The value of Chi-square which is 17.779 indicates that there is highly significant difference between the two groups centroids of all variables used.

In order to adjust for unequal means and standard deviation and hence indicating the relative importance of the variables in the discriminant function, the canonical coefficients were standardized (Table 10). Standardized beta coefficients were given for each variable in each discriminant (canonical) function, and the larger the standardized coefficient, the greater is the contribution of the respective variable to the discrimination between groups.

**Table 10: Standardized canonical discriminant function coefficients indicating the relative importance of the variables**

Variables	Function
Number of active household members	0.696
Off-farm income	0.643

However, these coefficients do not tell us between which of the groups the respective functions discriminate. Number of active household members has a larger value (0.696) than the income from off-farm income generating activities (0.643). This means that number of active household members discriminates the groups with higher magnitude compared to income from off-farm income generating activities. These results therefore, can be useful to ensure that APFS loans are granted to qualifying and eligible customers and that credits are issued to customers at minimum risk if the two discriminating variables are considered in the selection of potential borrowers.

Functions at group centroids are the average discriminant scores for each of the dependent variable categories. Two groups in discriminant analysis have two centroids, one for each group. The means are supposed to be well apart in order to show that the discriminant function is clearly discriminating. The closer the means, the more errors of classification there likely will be. Table 11 shows that, the average discriminate or canonical variable score for borrowers was 0.402 while that of non-borrowers was -0.402. This means that these two remaining variables in successive analysis were useful in discriminating borrowers and non-borrowers.

**Table 11: Functions of borrowers and non-borrowers at group centroids**

Respondent category	Function
Borrowers	0.402
Non-borrowers	-0.402

#### **4.4 Impact of credit on the use of modern agricultural inputs in crop and livestock production**

The study investigated the impact of loans on the use modern agricultural inputs by comparing the borrowers and non-borrowers. The study looked at the type of labour,



number labourers used on the farm, improved seeds, use of organic and inorganic manure and other agrochemicals.

#### 4.4.1 Type and number of labourers used on the farm

In most rural areas family labour has been found to be a major source of labour in production operations such as land preparation, planting, weeding, harvesting and feeding livestock. Reliance on family labour for farm work predominates in the study area. Individual's wealth and his/her daily activities were the determining factors for a farmer to use hired labour especially during peak labour demand. Results presented in Table 12 show that there was significant difference in type of farm labour used on the farm by respondents.

**Table 12: Type of labour used on the farm**

	Type of labour		
	Family labour	Hired labour	Family and hired labour
Borrowers (%)	21.7	33.3	45.0
Non-borrowers (%)	70.0	15.0	15.0
Total (%)	45.8	24.2	30.0

Chi-square significant at  $p < 0.01$

Borrowers used more hired labour in their farms compared to their counterparts i.e. non-borrowers. The difference was significant at  $p < 0.01$ . As mentioned above lack of capital in many rural areas is an obstacle for many smallholder farmers to hire labour on their farms. If hired labour is not used on the farm, household production will be reduced. On the other hand many borrowers were engaged in off-farm income generating activities that is why they hire labour in order to have enough time in their off-farm activities.

The mean comparison test which is presented in Table 13 indicates that number of labourers used on the farm was not significant at 5% level.

**Table 13: Number of labourers hired**

	Borrowers	Non-borrowers	Total
Mean	4.060	4.440	4.250
N	47	18	65
Standard deviation	2.471	3.417	2.940
Standard error of mean	0.360	0.805	0.583

t-value (-0.498) – Insignificant at 5% level of significance

This means that being either a borrower or a non-borrower did not signify the number of labourers used on the farm. It implies that even if a respondent was a non-borrower he/she used almost the same number of labourers as borrowers especially those non-borrowers who are able to hire labour. The number of labourers required depended on demand and not necessarily the employers to be borrowers or non-borrowers. But when it comes to type of labour used on farms, more borrowers used hired labour than non-borrowers (Table 12).

#### 4.4.2 Use of improved seeds, manure and other agrochemicals

Use of improved seeds in agricultural production was used to assess the impact of credit. The study found that local and improved seeds were both used in production. The improved seeds used were mainly purchased from SGA, local market centres and from few stockiest shops found in major trading centres. The results presented in Table 14 below show that there was significant difference in the type of seeds used by borrowers and non-borrowers at  $p < 0.05$ .

**Table 14: Use of modern agricultural inputs**

Type of inputs	Categories	Borrowers (n=60) (%)	Non- borrowers (n=60) (%)	Total (N=120) (%)	Chi-square value
Seeds	Improved	60.0	33.3	46.6	8.571*
Manure					

	None	10.0	11.6	22.5	13.068*
	Organic	80.0	51.7	65.8	
	Inorganic	0.0	1.70	0.85	
	Organic and inorganic	10.0	11.6	10.8	
Agrochemicals	Pesticides	10.0	15.0	12.5	0.686 <sup>NS</sup>

\* - Significant at  $p < 0.05$ , <sup>NS</sup> – Not significant at  $p < 0.05$

Borrowers used more improved seeds compared to non-borrowers. It was mandatory for a farmer to register himself/herself as member of SGA in order to be eligible borrower. This implies that borrowers had a greater chance of using improved seeds than non-borrowers. Non-borrowers who used improved seeds were mainly horticultural crop growers.

The continuous cultivation of one piece of land together with intercropping (banana and coffee) exhausts soil fertility. This situation necessitates the application of manure on farms in the study area. Table 14 also shows that there was significant difference in types of manure used between borrowers and non-borrowers at 5% level. According to the results obtained it is shown that many farmers are using organic manure, but borrowers are the ones who are using more organic manure (80%) than non-borrowers (51.7%). This high percentage of borrowers might be due to their advantage of accessing credit. In the study area a great part of organic manure is obtained from the livestock kept by farmers themselves and some from the national ranches of Misenye, Kitengule and Kikurula. Small proportion of organic manure is obtained from their fellow farmers.

Very few farmers both borrowers and non-borrowers were applying solely inorganic or a combination of organic and inorganic manure (Table 14). The reason given by the respondents was that, they are afraid that the use of inorganic manure may be detrimental to banana production since intercropping system is practiced in this area. Another reason given was that Kagera Co-operative Union (1990) (KCU) is encouraging coffee growers not to use inorganic manure and other agrochemicals so as to produce organic coffee which

is at a high demand in the world market. The little use of inorganic manure in banana growing areas was also reported by Nkonya *et al.* (2005) in Uganda.

In order to reduce prevalence of pests and disease attacks, pesticides are crucial in crop and livestock production. Moreover, the results presented in Table 14 show that in using other agrochemicals such as insecticides, fungicides and acaricides there was no significant difference between borrowers and non-borrowers at  $p < 0.05$ . It implies that acquiring credit does not influence the use agrochemicals. Nevertheless, a small proportion of farmers both borrowers and non-borrowers used pesticides. Those who used pesticides were mainly horticultural crop growers and dairy cattle keepers. In addition, the emphasis by KCU on coffee growers to produce organic product might be associated with the decreasing use of pesticides in the study area.

#### 4.4.3 Crop and livestock inputs expenditure

Modern crop and livestock inputs are either not available in the rural farmer's proximity or if available are very expensive for them. In places where credit is available to farmers it becomes a bit advantageous for them to acquire modern inputs though at higher prices. The study investigated if there were differences in input expenditure between borrowers and non-borrowers. Table 15 gives results of expenditure on crop inputs.

**Table 15: Estimated inputs expenditure on crop production**

	N	Mean input expenditure(TShs)	Standard deviation	Calculated t-value
Borrowers	60	134 107.5	146 539.84	1.152 <sup>NS</sup>
Non-borrowers	60	87 230.00	279 000.02	
Total	120	110 668.75	212 769.93	

<sup>NS</sup> t-value not significant at  $p < 0.05$

It was observed that there was no significant difference at  $p < 0.05$  in expenditure on modern crop inputs by borrowers and non-borrowers. Despite that insignificance, mean crop input expenditure was higher for borrowers (TShs 134 107.5) than non-borrowers who had TShs 87 230 mean crop input expenditure. This implies that the amount of money incurred on crop inputs was almost the same between borrowers and non-borrowers. The reason might be that borrowers spent a great part of their credits by investing in their off-farm businesses as most of them pointed out this during the survey. They claimed that investment in agriculture cannot bring about immediate returns. Results in Table 4 show that 83.7% of borrowers were involved in off-farm businesses.

Likewise, an investigation was carried out to see if there was significant difference in modern livestock input expenditure between borrowers and non-borrowers. The input expenditure was mainly for materials used to construct livestock shades, veterinary services and feeds such as maize bran, seed cake and minerals. Results based on cost of dairy cattle (Table 16) show that there was significant difference at  $p < 0.05$  in expenditure on modern livestock inputs by borrowers and non-borrowers.

**Table 16: Estimated inputs expenditure on livestock production**

	N	Mean input expenditure(TShs)	Standard deviation	Calculated t-value
Borrowers	48	45 378.13	68 088.91	2.497*
Non-borrowers	32	14 334.38	20 951.03	
Total	80	29 856.25	44 519.97	

\* t-value significant at 5% level of significance

Table 26 indicates that 48.08% of the borrowers kept dairy cattle compared to 18.18% of their counterparts. Therefore, the results imply that the level of livestock input expenditure was high for borrowers who kept more dairy cattle than non-borrowers. Therefore, farmers who have access to agricultural credit are expected to use more modern inputs in

comparison with those who have no access to credit in the project environment. This was also reported by Adato and Meinzen-Dick (2002) that financial capital is needed to purchase inputs to take advantage of a new technology. This understanding may lead to a different choice of intervention.

#### **4.5 Impact of credit on smallholder farmers' livelihoods**

Traditionally, income levels have been used to explain the well-being of individuals in the world. Today, apart from income of an individual, expenditure on basic needs, access to health services and increased assets are used to explain well-being of an individual.

##### **4.5.1 Smallholder farmers' estimated income and expenditure**

Information of income and expenditure estimates of smallholder farmers were obtained from crops sold such as coffee, bananas, maize, beans, vanilla and horticultural crops (tomatoes, green pepper, cabbage and carrots). In addition, income from off-farm income generating activities was from shops (kiosk), masonry, carpentry, tailoring, fishing and transportation.

###### **4.5.1.1 Estimated income obtained from crop production**

The farm income of most of the respondents in the study area was mainly from crop production due to the fact that income from sale of livestock and their products could not be quantified. The reason was that very few farmers indicated that they were relying on sale of livestock and their products as their major source of income. Table 4 shows that only 3.3% and 1.7% of borrowers and non-borrowers respectively relied on sale of livestock and their products as their major source of income. The results obtained from mean comparison test in Table 17 indicate that there was significant difference in farm income generated between borrowers and non-borrowers at 5% level.

**Table 17: Estimated income from the farm**

	N	Mean farm income(TShs)	Standard deviation	Calculated t-value
Borrowers	58	508 189.7	388 540.88	2.253*
Non-borrowers	60	314 925.0	529 883.09	
Total	118	411 557.4	459 211.98	

\* t-value significant at  $p < 0.05$

These results entail that borrowers were able to increase their returns from the farm because they had already agricultural projects that were going on. This was a condition to obtain credit.

#### 4.5.1.2 Estimated off-farm income

Off-farm businesses in rural areas are the means of diversifying their livelihoods and reduce risks associated with agriculture. It followed that 58.3% and 43.3% of borrowers and non-borrowers respectively mentioned off-farm business as their major source of income during the study (Table 4). On the other hand, 83.7% and 51.7% of borrowers and non-borrowers respectively indicated that they were involved in off-farm income generating activities (Table 4). Quantification of income obtained from such activities was then possible. The results in Table 18 obtained from mean comparison analysis again show that there was significant difference on mean off-farm income earned between borrowers and non-borrowers at  $p < 0.05$ .

**Table 18: Estimated off-farm income**

	N	Mean farm income(TShs)	Standard deviation	Calculated t-value
Borrowers	50	210 000.00	362 906.35	2.197*
Non-borrowers	31	65 548.39	52 491.16	
Total	81	137 774.19	207 698.75	

\* t-value significant at 5% level of significance

These results lead to the fact that capital obtained from credit by borrowers facilitated them to generate higher income compared to their counterparts.

#### 4.5.1.3 Expenditure on basic needs

Household expenditure on basic needs which were investigated on respondents were clothing, education, purchased food, health services and other emergency needs. Respondents were asked estimated amount of money they spend in a year on the above basic needs.

The results presented in Table 19 show that there were significant difference in household expenditure on basic needs between borrowers and non-borrowers especially on clothing, food and education. F-value for clothing ( $p < 0.05$ ), purchased food ( $p < 0.01$ ) and education ( $p < 0.05$ ).

**Table 19: Estimated expenditure on basic needs per annum**

Basic needs	N	Mean expenditure (TShs)	Standard deviation	Calculated m F-value
Clothing				
Borrowers	60	125 00.00	146 191.77	5.935*
Non-borrowers	58	53 620.69	72 817.92	
Education				
Borrowers	58	436 586.20	572 212.66	5.414*
Non-borrowers	54	215 574.10	452 839.28	
Purchased food				
Borrowers	60	504 666.70	574 318.21	11.577**
Non-borrowers	58	192 931.00	223 269.23	
Health services				
Borrowers	60	54 150.00	52 117.80	0.025 <sup>NS</sup>
Non-borrowers	57	38 456.14	85 152.39	
Other basic needs				
Borrowers	7	225 714.30	345 053.48	0.149 <sup>NS</sup>
Non-borrowers	4	161 250.00	227 975.69	

\*\* - Significant at  $p < 0.01$ , \* - Significant at  $p < 0.05$ , <sup>NS</sup> – Not significant at  $p < 0.05$

The implication of these results is that borrowers spent more on clothing, food and education. In addition, results in table 19 show that there was no significant difference between borrowers and non-borrowers on health services and other emergency needs



suggesting that these needs do not exclude a person on the basis of being a credit borrower or not.

#### **4.5.2 Asset ownership**

Type of assets owned by borrowers and non-borrowers which were compared using mean comparison test and cross-tabulation were household assets such as transport facilities and news media; other assets were land, human capital, livestock, farm tools and implements and housing facilities. The reason of this comparison was to assess farmers' admittance to fit into place in different livelihood strategies.

##### **4.5.2.1 Ownership of household assets based on village accessibility**

The selection of villages during the study was based on the agricultural potential in these areas. In order to see if there were significant difference on household assets possessed by borrowers and non-borrowers, the selection of villages was also based on accessibility in these villages.

Table 20 compares ownership of different means of transport, TV and radio by degree of village accessibility. The results show that there was no significant difference between borrowers based on village accessibility and types of transport facilities they owned. The borrowers living in villages with difficult accessibility made use of more motorcycles and bicycles (26.8%) compared to those in villages with easy accessibility (16.7%). The implication here is that the nature of infrastructure especially roads might necessitate the use of motorcycles and bicycles in villages with difficult accessibility.

**Table 20: Borrowers' ownership of transport facilities and news media based on accessibility**

Asset	Easy access (n=30) (%)	Difficult access (n=30) (%)	Total (N=60) (%)	Chi-square value
<b>Transport</b>				
None	10.0	3.3	6.6	7.484 <sup>NS</sup>
Bicycle	50.0	56.7	53.3	
Motorbike	0.0	6.6	3.3	
Both Bicycle + Motorbike	16.7	26.8	21.8	
Bicycle + Motorbike + Motor vehicle	13.3	6.6	10.0	
<b>News media</b>				
None	6.7	6.7	6.7	6.487*
Radio	66.6	90.0	78.3	
Both Radio + TV set	26.7	3.3	15.0	

\* - Significant at  $p < 0.05$ , <sup>NS</sup> – Not significant at  $p < 0.05$

As far as news media were concerned, the results show that there was significant difference between borrowers living in ease accessible villages and those living in villages with difficult accessibility. The results presented in Table 20 show that borrowers living in villages with easy accessibility who used TV sets and radio (26.8%) were more than their counterparts (3.3%). The high proportion of borrowers living in villages with easy accessibility to use TV sets and radio might be accounted for the presence of electricity services supplied by Tanzania Electric Supply Company Limited (TANESCO) in these villages.

On the other hand, Table 21 compares ownership of transport means and news media facilities of non-borrowers based on village accessibility. The results show that there was

no significant difference between non-borrowers based on village accessibility and on types of transport facilities and news media facilities they owned.

**Table 21: Non-borrowers' ownership of transport facilities and news media based on accessibility**

Asset	Easy access (n=30) (%)	Difficult access (n=30) (%)	Total (N=60) (%)	Chi-square value
Transport				
None	13.3	20.0	16.6	3.491 <sup>NS</sup>
Bicycle	76.7	70.0	73.4	
Motorbike	10.0	3.3	6.6	
Both Bicycle + Motorbike	0	3.4	1.7	
Bicycle + Motorbike + Motor vehicle	0	3.3	1.7	
News media				
None	13.4	6.7	10.1	0.747 <sup>NS</sup>
Radio	80.0	86.6	83.3	
Both Radio + TV set	6.6	6.7	6.6	

<sup>NS</sup> – Not significant at  $p < 0.05$

Very few non-borrowers living in villages with difficult accessibility made use of both motorcycles and bicycles (3.4%) compared to their counterparts where none used them. The issue of infrastructure especially roads still plays an important role as it was for borrowers. The insignificant difference between borrowers living in villages with easy accessibility and those living in villages with difficult accessibility on the use of news media facilities might be caused by low income generated from off-farm income and their disadvantage of not accessing credit.

Generally, Table 22 compares ownership of transport means and news media facilities between borrowers and non-borrowers based on village accessibility. The results show that there was no significant difference between borrowers and non-borrowers based on village accessibility and on types of transport facilities they owned.

**Table 22: Borrowers' and non-borrowers' ownership of transport facilities and news media**

Asset category	Borrowing level	Description of asset	Easy access (n=30) (%)	Difficult access (n=30) (%)	Total (N=60) (%)	Chi-square value
Transport means	Borrowers	None	10.0	3.3	6.6	7.484 <sup>NS</sup>
		Bicycle	50.0	56.7	53.3	
		Motorbike	0	6.6	3.3	
		Both Bicycle + Motorbike	16.7	26.8	21.8	
		Bicycle + Motorbike + Motor vehicle	13.3	6.6	10.0	
	Non-borrowers	None	13.3	20.0	16.6	3.491 <sup>NS</sup>
		Bicycle	76.7	70.0	73.4	
		Motorbike	10.0	3.3	6.6	
		Both Bicycle + Bike	0	3.4	1.7	
		Bicycle + Bike + Motor vehicle	0	3.3	1.7	
Media type	Borrowers	None	6.7	6.7	6.7	6.487*
		Radio	66.6	90.0	78.3	
		Both Radio + TV set	26.7	3.3	15.0	
	Non-borrowers	None	13.4	6.7	10.1	0.747 <sup>NS</sup>
		Radio	80.0	86.6	83.3	
		Both Radio + TV set	6.6	6.7	6.6	

\* - Significant at  $p < 0.05$ , <sup>NS</sup> – Not significant at  $p < 0.05$

The borrowers living in villages with difficult accessibility made use of more motorbikes and bicycles (26.8%) compared to those in villages with easy accessibility (16.7%). But very few non-borrowers living in villages with difficult accessibility made use of motorbikes and bicycles (3.4%). The implication here is that the nature of infrastructure especially roads might necessitate the use of motorcycles and bicycles in villages with difficult accessibility. The issue of income might also be a reason between borrowers and non-borrowers, since borrowers are better off compared to their counterparts (Table 18).

As far as news media were concerned, the results show that there was significant difference between borrowers living in villages with easy accessibility and those living in villages with difficult accessibility. The results presented in Table 22 show that borrowers living in villages with easy accessibility who used TV sets and radio (26.7%) were more than their counterparts (3.3%). The high proportion of borrowers living in villages with easy accessibility to use TV sets and radio might be accounted for by the presence of electricity services supplied by TANESCO in these villages.

On the other hand, Table 22 also compares ownership of transport means and news media facilities of non-borrowers based on village accessibility. The results show that there was no significant difference between non-borrowers based on village accessibility on types of transport facilities and news media facilities they owned. Very few non-borrowers living in villages with difficult accessibility made use of motorbikes and bicycles (3.4%) compared to their counterparts where none used them. The issue of infrastructure especially roads still plays an important role as it was for borrowers. The insignificant difference between non-borrowers living in villages with easy accessibility and those living in villages with difficult accessibility on the use of news media facilities might be caused by low income generated from off-farm income and their disadvantage of not accessing credit.

#### 4.5.2.2 Estimated value of household assets

Household assets are the components of the household physical capital and can be used to measure livelihood improvement. Therefore, estimating the value of household assets is fundamental in assessing livelihood improvement of respondents. Hence, respondents were asked to give estimates of the value of household assets they owned. Among other assets mentioned, transport means, news media facilities, furniture and kitchen facilities were included. The total value of these household assets was obtained and means value was compared between borrowers and non-borrowers. Table 23 shows that there was significant difference on estimated mean asset value between borrowers and non-borrowers at 5% level.

**Table 23: Estimated value of household assets**

	N	Mean asset value (TShs)	Standard deviation	t-value (2-tailed)
Borrowers	60	455 270.00	957 729.35	2.495*
Non-borrowers	59	131 247.46	281 220.75	
Total	119	293 258.73	619 475.05	

\*t-value significant at 5% level of significance

The comparison of mean estimated value of household assets (Table 23) indicated that borrowers had high valued household assets than non-borrowers. The implication is that credit had impact on farmers' quality life. The similar results were reported by Mohamed (2003) in Zanzibar that the increase of assets value of individuals who belong to low income group was caused by credit facility. Kamuzora (2001) also supported that, possession of valued assets reflect income levels.

#### 4.5.2.3 Ownership of land

Mean land area (ha) was compared between borrowers and non-borrowers. The results presented in Table 24 demonstrate that there was no significant difference between borrowers and non-borrowers on possession of land. In other words, both groups were similar in acreage terms.

**Table 24: Land area possessed by respondents**

	N	Mean land area (ha)	Standard deviation	Calculated t-value
Borrowers	60	2.26	1.86	1.335 <sup>NS</sup>
Non-borrowers	60	1.64	3.08	
Total	120	1.95	2.47	

<sup>NS</sup> t-value not significant at  $p < 0.05$

This signifies that land area possessed by borrowers and non-borrowers is more less the same. Most of the respondents possess small pieces of land they inherited from either their parents or close relatives otherwise it is too expensive to purchase a piece of land. The same results were reported by De Weerd (2006) that fertile pieces of land in Bukoba are scarce and are generally purchased from private individuals at higher price.

#### 4.5.2.4 Estimated value of farm tools and implements

Different types of farm tools and implements possessed by farmers include hand hoes, bush knives, axes, machetes, sickles, manual irrigation pipes, knapsack sprayers and wheelbarrows. The estimated value of farm tools and implements reported by borrowers and non-borrowers were summed up to get a total value. Mean farm tools and implements value was then compared between borrowers and non-borrowers. Although similar demand in farm tools and implements between borrowers and non-borrowers existed, purchasing power separated them. The results in Table 25 show that there was significant difference

on the estimated value of farm tools between borrowers and non-borrowers at 1% level of significance.

**Table 25: Estimated value of farm tools and implements**

	N	Mean value (TShs)	Standard deviation	Calculated t-value
Borrowers	60	28 260.00	15 142.27	3.411**
Non-borrowers	60	19 324.17	13 613.55	
Total	120	23 807.08	14 377.91	

\*\* t-value significant at 1% level of significance

Table 25 also indicates that borrowers had higher mean value of farm tools and implements (TShs 28 260.00) than non-borrowers (TShs 19 324.17). The results imply that borrowers and non-borrowers had different types of farm activities. This might be the effect of credit on borrowers who mostly engaged themselves in dairy cattle keeping and horticultural crops growers. The two agricultural activities require higher valued farm tools such as knapsack sprayers and manual irrigation pipes. Farmers who were not involved in these agricultural activities were not in need of these tools. In addition, purchasing power and cash availability give an opportunity for borrowers to own more advanced farm implements compared to non-borrowers. Again this difference might be caused by the effect of credit.

#### 4.5.2.5 Livestock ownership

Many farmers consider livestock keeping as an alternative income generating activity when there is an emergency. Respondents in the study area kept different types of livestock. Types of livestock kept include local chicken, dairy cattle, indigenous cattle, goats, pigs and duck.

**Table 26: Livestock owned by respondents**

Type of livestock	Borrowers (%) (n=52)	Non-borrowers (%) (n=44)	Total (N=96)	Chi-value value
----------------------	-------------------------	-----------------------------	-----------------	--------------------



Local chicken	30.77	54.55	42.66	14.948*
Dairy cattle	48.08	18.18	33.13	
Indigenous cattle	9.62	6.82	8.22	
Goats	9.61	13.64	11.62	
Pigs	1.92	4.55	3.24	
Ducks	0	2.26	1.13	

\*Significant at 5% level of significance

The Chi-square test in Table 26 illustrates that there was significant difference between borrowers and non-borrowers on number/type of livestock kept ( $p < 0.05$ ). About 48.08% of the borrowers kept dairy cattle compared to 18.18% of their counterparts. It means credit might influence dairy cattle keeping among borrower since dairy cattle keeping demands high capital. The same was reported by Tefera (2007) in the study that determined the effect of the goat credit project on women farmers' welfare through a credit-in-kind approach. He observed that women acquired assets and diversified their livelihoods by purchasing and raising poultry, cows, oxen, and donkeys. Results presented in Table 26 also show that most of non borrowers (54.55%) kept local chicken and borrowers (30.77%) also kept local chicken. These are types of livestock which are cheaply kept in terms of feeds because they are able to feed themselves independently in the household surroundings or on food left- over. During the survey farmers reported that local chickens were both for consumption and sale during emergency.

#### 4.5.2.6 Household size

Larger household size might bear a burden to the household head or bread winner hence a decision of adopting credit as an alternative for producing more to feed household members may be opted. A comparison between borrowers and non-borrowers mean household size was made. Table 27 designates that there was significant difference at  $p < 0.01$  in mean household size between borrowers and non-borrowers. This significant difference might also be associated with the influence of accessing credit.

**Table 27: Total members of household**

	N	Mean	Standard deviation	Calculated t-value
Borrowers	60	7.23	2.56	3.315**
Non-borrowers	60	5.85	1.97	
Total	120	6.54	4.53	

\*\* t-value significant at  $p < 0.01$

#### 4.5.2.7 House ownership and type of housing materials

Houses and land are used as mortgage to be eligible to take credit. In addition, owning a house in particular is an indication of more credibility that an individual qualifies for loan acquisition. Permanent settlement in a certain area is signified by an individual to possess a house which is an immovable asset. During the survey most of the respondents reported to own houses. The type of housing materials used by both borrowers and non-borrowers to construct their houses were also subjected to Chi-square test for comparison. Table 28 gives the results that there was significant difference between borrowers and non-borrowers on type of wall and roof materials used at  $p < 0.01$  while on type of floor significant difference was at  $p < 0.05$ .

**Table 28: Housing materials used and other facilities**

Material	Borrowers (n=60) (%)	Non-borrowers (n=60) (%)	Total (N=120) (%)	Calculated Chi-square
Type of wall				
Mud + wood	6.7	58.3	32.5	40.258**
Wood + mud + Cement	5.0	3.3	4.2	
Heated bricks + Cement	61.7	18.3	40.0	
Heated bricks + Mud	21.6	13.3	17.5	
Bricks not heated	5.0	6.8	5.8	
Type of roof				
Thatch	0	20.0	10.0	13.333**
Iron sheet	100	80.0	90.0	
Type of house floor				
Mud floor	30.0	80.0	55.0	30.303**
Cement	70.0	20.0	45.0	
Type of toilet				

Not available	0	1.7	0.8	1.676 <sup>NS</sup>
Pit hole	93.3	95.0	94.2	
Water flash toilet	6.7	3.3	5.0	

\*\* - Significant at  $p < 0.01$ , \* - Significant at  $p < 0.05$ , <sup>NS</sup> – Not significant at  $p < 0.05$

This comparison shows us that borrowers used building materials of high quality as compared to non-borrowers. Most of borrowers (61.7%) used heated bricks and cement compared to non-borrowers (18.3%). Cement was either used for plastering walls or joining bricks. Heated bricks are common and preferred to bricks made of cement in this area due to high prices of cement in Kagera region.

A great proportion of non-borrowers (58.3%) used mud and wood to construct houses compared to borrowers (18.3%). The use of mud and wood poles gives the impression that these are the cheapest building materials in the study area. For the case of roofing materials, only two types were reported to be common among the farmers. These were corrugated iron sheets and thatch (grasses). All borrowers in the study area used corrugated iron sheets whereas 20% and 80% of non-borrowers used thatch and iron sheets respectively. The same applies to the type of floor, many borrowers (70%) owned cement floor while 80% of non-borrowers owned mud floor.

Concerning type of toilet available in the farmers' premises, results in Table 28 indicate that there was no significant difference between borrowers and non-borrowers. This implies that having a toilet does not exclude someone on the basis of being a borrower or not.

### 4.5.3 Human and social capital among respondents

Human capital includes education, skills, knowledge, health, nutrition, and labor power.

Social capital includes any networks that increase trust, ability to work together, access to opportunities, reciprocity; informal safety nets; and membership in organizations.

#### 4.5.3.1 Access to health services

Accesses to health services are used to explain well-being of an individual since healthy and productive members are important assets in household production activities. There was no significant difference in mean distance to health services centres between borrowers and non-borrowers as indicated in Table 29.

**Table 29: Distance to health centres**

	N	Mean distance (km)	Standard deviation	Calculated t-value
Borrowers	60	4.79	6.18	-0.019 <sup>NS</sup>
Non-borrowers	60	4.81	5.39	
Total	120	4.80	5.79	

<sup>NS</sup> t-value significant at  $p < 0.05$

Mean distance to health services centres for borrowers was 4.79 km while for non-borrowers was 4.81 km. This insignificant difference on distance to health service centres between borrowers and non-borrowers leads to the fact that health centres in rural areas in Tanzania are evenly distributed and obviously a case of being a borrower or not cannot be taken into account.

#### 4.5.3.2 Status of a respondent to belong to social organizations

Social capital includes any networks that increase trust, ability to work together, access to opportunities, reciprocity; informal safety nets; and membership in organizations. During the survey status of a respondent to belong in social organizations especially SACCOS was

considered. The results presented in Table 30 show that there was significance difference on status of a respondent to belong in social organization between borrowers and non-borrowers at  $p < 0.01$ .

**Table 30: Status of a respondent to belong to social organizations**

Status	Borrowers (%) (n=60)	Non-borrowers (%) (n=60)	Total (N=120)	Chi-value value
Member	63.3	21.7	42.5	21.313**
Not a member	36.7	78.3	57.5	

\*\*Significant at 1% level of significance

The indication is that many borrowers (63.3%) participated in organizations compared to only 21.7% of non-borrowers. The similar observation was reported by Tefera (2007) in the goat credit project where women farmers became more economically empowered, which enabled them to gain greater control over their resources, which in turn increased their capacity to participate in social activities and household decision making.

In accordance with the results obtained, significant difference on farmers' livelihood between borrowers and non-borrowers imply that credit influenced the improvement in rural livelihood. Therefore farmers who had access to agricultural credit are expected to have improved rural livelihood in comparison with those who had no access to credit in the project environment. The similar situation was also reported by Tefera (2007) who observed that women in goat credit project in Ethiopia acquired assets and diversified their livelihoods.

## CHAPTER FIVE

### 5.0 CONCLUSION AND RECOMMENDATIONS

#### 5.1 Conclusion

In respect of the underlying objectives and hypotheses major findings have emerged from this study. Therefore some conclusion can be drawn with regard to impact of credit on livelihoods of smallholder farmers in Kagera region.

- (i) The results of this study indicated that out of seven socio-economic characteristics hypothesized to distinguish borrowers and non-borrowers, only two socio-economic characteristics were found to discriminate borrowers and non-borrowers. These were number of active family members and the income from off-farm income generating activities. Other socio-economic factors were not significant in discriminating borrowers and non-borrowers.
- (ii) There was significant difference in the use of modern agricultural inputs with high demanded inputs especially for dairy cattle keepers between borrowers and non-borrowers implying that credit influenced the use of modern inputs. Moreover, it was observed that there was no statistical significant difference in modern crop inputs expenditure by borrowers and non-borrowers. However, despite lack of significant difference, mean crop input expenditure was higher for borrowers than non-borrowers. The amount of money incurred on crop inputs was almost the same between borrowers and non-borrowers. The study revealed that borrowers spent a great part of their credits by investing in their off-farm businesses.

- (iii) Generally, there was also significant difference on farmers' livelihoods pattern between borrowers and non-borrowers implying that credit play a major role in improving living standards of the rural folks. Thus farmers who had access to agricultural credit are likely to improve their standard of living and get out of poverty than otherwise.

## **5.2 Recommendations**

Agricultural credit is very expensive and its administration is fraught with many difficulties such as shortage of suitable manpower, difficulties of assessing economic potential, problem of defaulters and subsequent high collection costs, as well as actual shortage of funds. It is therefore, important to be noted by policy makers that all efforts be made to make agricultural credit effective. However, the study has highlighted some important clues which are worth noting.

- (i) Provision of agricultural credit should be part of an integrated agricultural development programme including extension services, provision of inputs, appropriate marketing arrangements and training agricultural credit personnel. In addition, agricultural credit must be sponsored by the government and must be viewed primarily as a public service and an instrument for agricultural development rather than a banking business enterprise.
- (ii) Whenever possible and necessary, agricultural credit should be granted mainly in kind, by installments or direct payment to agricultural input suppliers in order to avoid diversion of the credit funds to other unintended uses. This has been the case for most borrowers in the study area where credit was disbursed directly to borrowers in cash.

- (iii) The study aimed at assessing the impact assessment of credit on rural livelihoods of smallholder farmers. Hence, more studies are recommended on rural livelihoods brought about by provision of agricultural credit in different parts of Tanzania because the country is vast and the farmers have different cultures and perform different farming activities in dissimilar environments.



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**APPENDICES**

**Appendix 1: Credit borrowers’ questionnaire**

**QUESTIONNAIRE NUMBER:** .....

**DATE:** .....

**Division:** .....

**Ward:** .....

**Village:** .....

**A: GENERAL INFORMATION**

1. Name of respondent .....

2. Gender (1) Male ..... (2) Female ..... 3. Age .....

4. Position in the household

(1) Household head

(2) Other (specify)

5. Marital status:

(1) Single

(2) Married

(3) Widower

(4) Divorced

6. Education Level:

(1) No formal education

(2) Adult education

(3) Primary education

(4) Secondary Education

(5) Higher education

7. Number of household members (years): M F

i. Under 5 years

ii. Between 5 – 17 years

iii. 18 years and above

8. Number of children who go to school at present: (i) Public school .....

(ii) Private school .....

**B: PRODUCTION AND USE OF INPUT**

1. Do you own land for agricultural purposes 1. Yes 2. No

2. If No do you rent land? 1. Yes 2. No

3. Total farm size (ha): .....

4. Actual farm size use (ha): .....

5. Farmer’s years in farming: .....

6. Indicate type of labour employed in farm work:

(1) Family labour

(2) Hired labour

(3) Other (specify) .....

7. If you hired labour, how many labourers worked on your farm last season? .....

8. What type of crops do you grow?

i. Food crops

1. .... 2. .... 3. ....

ii. Cash crops

1. .... 2. .... 3. ....

9. What amount of the above farm produce did you sell last season?

	Crop	Quantity produced	Quantity sold	Quantity consumed	Price/unit (Tshs)
1					
2					
3					

10. Which type of seeds do you mainly use in raising crops?



- 1) Local seeds  
2) Improved seeds
11. What type of manure do you use in most cases on your farm?  
1) Organic manure  
2) Inorganic fertilizer  
3) Organic manure and inorganic fertilizer  
4) None
12. Do you apply any agrochemicals (pesticides) in either crop raising or livestock keeping? 1. Yes 2. No
13. Which of the following farm inputs were used in the last cropping season?

Input	Type of crops	Quantity used	Amount spent (Tshs)
Hired labour			
Local seeds			
Fertilizers			
Other agrochemicals			
Other farm implements			

14. Do you keep livestock? 1. Yes 2. No

15. If yes, what type of livestock do you keep?

- a. ....  
b. ....  
c. ....

16. Name inputs used in livestock keeping.

	Input	Type of livestock	Quantity used	Amount spent (Tshs)
1				
2				
3				
4				
5				

17. Name livestock produce you obtained:

	Livestock	Product	Output	Quantity produced	Quantity sold	Price/unit (Tshs)
1						
2						
3						
4						
5						

### C: SOURCES OF INCOME

1. What is your major source of income?

- a. Sale of food crops = 1  
b. Sale of cash crops = 2  
c. Sale of livestock and its products = 3  
d. Wage employment = 4  
e. Others .....

2. Do you have any off-farm income generating (not employment) activities? 1. Yes  
2. No

3. If yes what are they?

- i. ....
- ii. ....
- iii. ....

4. Indicate income estimates realized from off-farm sources/activities.

	Activities or sources	Estimated income(TShs)
1		
2		
3		
4		

**D: CREDIT INFORMATION**

1. How did you learn about the availability of credit?  
 .....

2. Indicate the reasons that influenced you to take credit.

Loan size = 1

Interest rate = 2

Both = 3

Type of collateral required = 4

Other (specify) = 5

3. From which bank did you obtain credit?

- 1. TPB
- 2. KFCB

4. Were you trained on credit utilization before being given credit?

- 1. YES
- 2. NO

5. Was some of the credit obtained used for consumption purposes?

- 1. YES
- 2. NO

6. Are you in arrears of the above credit? 1. YES 2. NO

7. What sort of penalties is imposed by the bank for late payment or default?  
 .....

8. How many times have you received credit from KAEMP? .....

9. Will you continue requesting credit from KAEMP? 1. YES 2.NO

10. Do you feel that the existing credit facilities are adequate for your crop production needs? 1. YES 2.NO

11. Did you save any amount in the bank after loan repayment? 1. YES 2. NO

12. Did you obtain credit from other sources before? 1. YES 2. NO

13. If YES, what was that source of credit?

SACCOS = 1

Other BANKS = 2

NGOs e.g. FINCA, PRIDE etc = 3

Others (specify) ..... = 4

14. Do you feel that the existing credit facility is adequate for your agricultural production needs? 1. YES 2. NO

**E: TYPE OF HOUSE AND ASSETS AVAILABLE**

1. Do you own a house? 1. YES 2. No

2. If No, were do you reside?

- (1) Rented house
- (2) Relative's house
- (3) Neighbour's house

3. If you are Renting, how much do you pay per month? TShs: .....

4. House condition:

Type of wall	1	Mud + Wood
	2	Wood + Mud + Cement
	3	Heated bricks + Cement
	4	Heated bricks + Mud
	5	Bricks not heated
	6	Bricks made of cement
Type of floor	1	Mud floor
	2	Floor made of cement
Type of roof	1	Thatch
	2	Corrugated Iron sheets
Toilet	1	Not available
	2	Pit hole
	3	Water flash toilet
Kitchen	1	Present
	2	Not present

5. Assets available in the house:

		Type of asset	Total	Asset value
Transportation	1	Motorcar		
	2	Motorbike		
	3	Bicycle		
House assets	1	Tables		
	2	Chairs		
	3	Soffer sets		
	4	Wardrobe		
Farm implements	1	Tractor		
	2	Hand hoe		
	3	Machetes		
	4	Bush knives		
	5	Sickles		
	6	Axes		
Kitchen facilities	1	Local stone stove		
	2	Charcoal cooker		
	3	Kerosene stove		
	4	Electric cooker		
	5	Refrigerator		
News media	1	Radio		
	2	TV		

6. What is the major source of food for your household?

(1) Own farm

(2) Purchases

(3) Others (specify) .....

7. Do you have access to health services? 1. YES 2. NO

If yes, mention the type of health services

(1) Traditional services

(2) Public services

(3) Private services

8. How far is the health centre? ..... km.

9. How many times do you visit the health centre in a month? .....

10. What was your estimated expenditure on clothing, education, health services, and food one year back?

Items	Estimated value (TShs)
1. Clothing	
2. Education	
3. Food	
4. Health services	
5. Others (specify)	

11. Are you a member in any of the Savings and Credit Cooperative Societies in your area?

1. YES 2. NO

## Appendix 2: Non- credit borrowers' questionnaire

**QUESTIONNAIRE NUMBER:** .....

**DATE:** .....

**Division:** .....

**Ward:** .....

**Village:** .....

### A: GENERAL INFORMATION

1. Name of respondent .....

2. Gender (1) Male ..... (2) Female ..... 3. Age .....

4. Position in the household

(1) Household head

(2) Other (specify)

5. Marital status:

(5) Single

(6) Married

(7) Widower

(8) Divorced

6. Education Level:

1) No formal education

2) Adult education

3) Primary education

4) Secondary Education

5) Higher education

7. Number of household members (years):

i. Under 5 years

M

F

ii. Between 5 – 17 years

iii. 18 years and above

8. Number of children who go to school at present: (i) Public school .....

(ii) Private school .....

9. Are you a member of Seeds Growers Association (SGA) of this area? 1. YES

2. NO

10. Were you aware of the credit facilities from KAEMP? 1. YES 2. NO

11. What are the reasons for not taking credit from KAEMP?

1 = Lack of security 2 = High interest rate 3 = Not aware of credit availability

4 = High risk 5 = Not needed 6 = Applied for but not given

12. Do you obtain credit from any other sources?

1. YES 2. NO

13. If YES, what is that source of credit?

SACCOS = 1

Other BANKS = 2

NGOs e.g. FINCA, PRIDE etc = 3

Others (specify) ..... = 4

14. Do you feel that credit facilities are adequate for your agricultural production needs?

1. YES 2. NO

### B: PRODUCTION AND USE OF INPUT

1. Do you own land for agricultural purposes 1. YES 2. NO

2. If No do you rent? 1. YES 2. NO

3. Total farm size (ha): .....

4. Actual farm size use (ha): .....

5. Farmer's years in farming: .....

6. Indicate type of labour employed in farm work:

(1) Family labour

(2) Hired labour

(3) Other (specify) .....

7. If you hired labour, how many labourers worked on your farm last season? .....

8. What type of crops do you grow?

iii. Food crops

1. .... 2. .... 3. ....

iv. Cash crops

1. .... 2. .... 3. ....

9. What amount of the above farm produce did you sell last season?

	Crop	Quantity produced	Quantity sold	Quantity consumed	Price/unit (Tshs)
1					
2					
3					

10. Which type of seeds do you mainly use in raising crops?

- 1) Local seeds
- 2) Improved seeds

11. What type of manure do you use in most cases on your farm?

- 1) Organic manure
- 2) Inorganic fertilizer
- 3) Organic manure and inorganic fertilizer
- 4) None

12. Do you apply any agrochemicals (pesticides) in either crop raising or livestock keeping? 1. Yes 2. No

13. Which of the following farm inputs were used in the last cropping season?

Input	Type of crops	Quantity used	Amount spent (Tshs)
Hired labour			
Local seeds			
Fertilizers			
Other agrochemicals			
Other farm implements			

14. Do you keep livestock? 1. Yes 2. No

15. If yes, what type of livestock do you keep?

- a.....
- b.....
- c.....

16. Name inputs used in livestock keeping

Input	Type of livestock	Quantity used	Amount spent (Tshs)

17. Name livestock produce you obtained:

	Livestock	Product	Output	Quantity produced	Quantity sold	Price/unit (Tshs)
1						
2						
3						

**C: SOURCES OF INCOME**

1. What is your major source of income?

- f. Sale of food crops = 1
- g. Sale of cash crops = 2
- h. Sale of livestock and its products = 3
- i. Wage employment = 4
- j. Others .....

2. Do you have any off-farm income generating (not employment) activities? 1. Yes

2. No

3. If yes what are they?

- iv. ....
- v. ....
- vi. ....
- vii. ....

4. Indicate income estimates realized from off-farm sources/activities.

	Activities or sources	Estimated income (TShs)
1		
2		

**D: TYPE OF HOUSE AND ASSETS AVAILABLE**

1. Do you own a house? 1. YES 2. No

2. If No, where do you reside?

- (1) Rented house
- (3) Relative's house
- (3) Neighbour's house

3. If you are Renting, how much do you pay per month? TShs: .....

4. House condition:

Type of wall	1	Mud + Wood
	2	Wood + Mud + Cement
	3	Heated bricks + Cement
	4	Heated bricks + Mud
	5	Bricks not heated Bricks made of cement
Type of floor	1	Mud floor
	2	Floor made of cement
Type of roof	1	Thatch
	2	Corrugated Iron sheets
Toilet	1	Not available
	2	Pit hole
	3	Water flush toilet
Kitchen		Present
		Not present

## 5. Assets available in the house:

		Type of asset	Total	Asset value
Transportation	1	Motorcar		
	2	Motorbike		
	3	Bicycle		
House assets	1	Tables		
	2	Chairs		
	3	Soffer sets		
	4	Wardrobe		
Farm implements	1	Tractor		
	2	Hand hoe		
	3	Machetes		
	4	Bush knives		
	5	Sickles		
	6	Axes		
Kitchen facilities	1	Local stone stove		
	2	Charcoal cooker		
	3	Kerosene stove		
	4	Electric cooker		
	5	Refrigerator		
News media	1	Radio		
	2	TV		

## 6. What is the major source of food for your household?

(1) Own farm

(2) Purchases

(3) Others (specify) .....

## 7. Do you have access to health services? 1. YES 2. NO

## 8. If yes, mention the type of health services

(4) Traditional services

(5) Public services

(6) Private services

## 9. How far is the health centre? ..... km.

## 10. How many times do you visit the health centre in a month? .....

## 11. What was your estimated expenditure on clothing, education, health services, and food per month?

Items	Estimated value (TShs)
1. Clothing	
2. Education	
3. Food	
4. Health services	
5. Others (specify)	

## 12. Are you a member in any of the Savings and Credit Cooperative Societies in your area?

1. YES 2. NO