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The Impact of Microfinance on Household Livelihoods: Evidence from Rural Eritrea

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A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the

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ABSTRACT

Eritrea, a relatively young African nation, is one of the least developed countries in the world. Its economy is predominantly dependent on subsistence agriculture and the level and magnitude of poverty is more severe in rural areas. The formal financial sector is underdeveloped, state-owned, far from being competitive, and limited in terms of depth and breadth as measured by the relevant financial sector development indicators. To address the limitations of the formal banking sector and to help fill the financing gap, and improve the general livelihood of those at the lower income group, the Government of Eritrea introduced a Saving and Microcredit Programme (SMCP) in 1996 for which no scientific study measuring its impact has been done at the household level. The study was conducted in rural areas to find out whether the SMCP as a microfinance institution has improved the livelihood of its clients. The specific objectives of the study were to describe the characteristic feature of rural livelihoods in terms of the resources owned, the strategies pursued and outcomes achieved, identify and examine the determinants of household participation in the SMCP and finally assess the impact of participation in SMCP on household livelihoods. The study employed a quasi-experimental cross-sectional survey design involving structured and semi-structured questionnaire administered to 500 respondents of whom 200 represented the treated group and 300 the controlled group. Logit regression was employed to identify the factors that determine household participation in the SMCP. In regard to this, age of the client household, household size, marital status, level of education of the client household, the size of first round loan, entrepreneurial experience, type of loan product offered by the institution, ownership of livestock and microenterprise, the perception of the client on involuntary deposits, the occurrence of a negative events (shock) to the household and village access to electricity were found to have statistically significant effect on the household's probability to participate in the SMCP. Furthermore, the marginal effects were also computed to evaluate the contribution of each of these factors to the likelihood of participating in the SMCP. A propensity score matching model was applied to assess the impact of the programme on the livelihood of its clients. The findings reveal that participation in the SMCP has a significantly higher average treatment effect on the treated (ATT) households. Profits generated from off-farm and small microenterprises, the values of household and livestock assets, food and non-food consumption expenditures and nutrition quality, were

found to be on average higher for the treated households than for the controlled households. Therefore, it could be argued that the provision of micro financial resources has significant positive effects on household livelihood outcomes. The study has important social and economic policy implication regarding the role of finance in rural development.

KEY WORDS

Eritrea

Household

Impact

Livelihood

Logit

Microfinance

Participation

Propensity Score Matching

Rural

Saving and Microcredit Programme

DECLARATION

I declare that *The Impact of Microfinance on Household Livelihoods: Evidence from Rural Eritrea* is my own work and that it has not been submitted before for any degree or examination in any other university or institution. All the sources used, referred to, or quoted have been indicated and acknowledged as complete references.

Amine Teclay Habte

Signed……..

Date……..

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DEDICATION

I dedicate this thesis to
my wife Freweini Berhe and
our beloved children –Shalom, Naod and Naomi
I love you all dearly

ACRONYMS

ATT	Average Treatment Effect on the Treated
BDS	Business Development Service
BoE	Bank of Eritrea
CBE	Commercial Bank of Eritrea
CFSVA	Comprehensive Food Security and Vulnerability Analysis
CIA	Conditional Independence Assumption
CLTS	Community Led Total Sanitation
COMESA	Common Market for Eastern and Southern Africa
DEFID	Department for International Development
ECDF	Eritrean Community Development Fund
EDHS	Eritrean Demographic and Health Survey
EDIB	Eritrean Development and Investment Bank
EPHS	Eritrean population Health Survey
ERREC	Eritrean Relief and Refugee Commission
FAO	Food and Agricultural Organisation
FCS	Food Consumption Score
FSA	Financial Sustainability Approach
FSSP	Food Security Strategy Paper
GDP	Gross Domestic Product
GNI	Gross National Income
GoE	Government of Eritrea
HCBE	Housing and Commerce Bank of Eritrea
HEPM	Household Economic Portfolio Model
HHI	Herfindahl-Hirschman Index
HIV	Human Immune Virus
IAL	Irrigated Agricultural Loan
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
LSMS	Living Standards Measurement Survey
MBL	Microbusiness Loan
MDG	Millennium Development Goals
MIT	Ministry of Trade and Industry
MND	Ministry of National Development
MOA	Ministry of Agriculture
NICE	National Insurance Corporation of Eritrea
NSEO	National Statistics and Evaluation Office
NSO	National Statistics Office
ODF	Open Defecation Free
OL	Oxen Loan
PLA	Poverty Lending Approach
PPA	Participatory Poverty Assessment
PRSP	Poverty Reduction Strategy Paper
PSM	Propensity Score Matching
RCT	Randomised Control Trial
ROSCA	Rotating Saving and Credit Association
RRPE	Recovery and Rehabilitation Programme for Eritrea

SBL	Small Business Loan
SLA	Sustainable Livelihood Approach
SMCP	Saving and Microcredit Programme
SSAL	Small Seasonal Agricultural Loan
UN	United Nations
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organisation
VIF	Variance Inflation Factor
WFP	World Food Programme
WHO	World Health Organisation

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND

The main focus of this study is to empirically assess and analyse the impact of microfinance on household livelihoods in rural Eritrea. The Saving and Microcredit Programme (SMCP) is a microfinance institution in Eritrea which has been in operation since 1996 with the objective of extending microcredit and taking deposits to enable poor households who are underserved by the formal financial institutions to improve their socio-economic conditions.

Poverty is as old as human history. It is reflected in many forms and causes multiple harms. Lack of basic necessities such as food, water, and shelter, high rate of unemployment, prevalence of diseases, homelessness, and marginalisation are some of the common features observed among the poor which also reinforce to each other (Ogwumike and Akinnibosun, 2013). The results among those affected is manifested in the form of physical, mental, and emotional disability, limited skills and education, low self-esteem and lack of self-confidence, and exhibit general powerlessness. The prevalence of poverty also limits people's opportunities, undermines their assets, and capabilities, as well as increases their exposure to risk (IFAD, 2011). Nobel Prize winner Sen (1999) observed that "poverty must be seen as the deprivation of basic capabilities" which undermines the resources of the poor.

Literature in development economics indicates that access to financial resources has been a stimulant of the development process (Lynch, 1996; Winkler, 1998; Williamson and Mahar, 1998; Thiel, 2001; Todaro and Smith, 2012). As a result the establishment of formal financial institutions becomes a critical component of any development policy. However, the formal financial sector has historically excluded the poor, because there was no business case to justify many low transactions involving high transaction costs (Dean, 2011). Moreover, formal financial institutions in the developing countries are characterised by market imperfections that resulted in credit market failure. Financial market failure particularly

limits the availability of financial resources to the poor due to information asymmetry, high fixed costs in the form of collateral and bureaucratic procedures of formal financial institutions, among others. The poor substantially benefit from accessing to small-scale financial resources such as credit and savings. Where available, these and other financial services help low-income people improve their livelihood, create and expand microenterprises, increase productivity, smooth income and consumption flows, enlarge and diversify their income sources, and thus improve their welfare.

Therefore, improving access to finance, especially access to credit by providing small loans, is considered as a necessary condition to reduce poverty since it contributes to strengthen the poor's productive assets including their human capital (World Bank, 2001; Arouri, Ben Youssef, Duraira, Dahmani, and Mungomba, 2014). Recognizing the problem of market imperfections in the formal financial sector of developing countries, microfinance was introduced in the 1970s by the Grameen Bank in Bangladesh (Armendariz and Morduch, 2005).

Since then the provision of micro financial resources has been advocated as an effective poverty alleviation and development tool. What's collectively known as "microfinance" includes micro-credit, micro-savings, micro-insurance and money transfer (Armendariz and Morduch, 2005). It has been attributed, according to Manalo (2003), Sharma (2013), Adu, Anarfi and Poku (2014) that by enabling small scale entrepreneurs to set up and build businesses and increase their income, as well as improve the general economic wellbeing of the poor in rural and urban areas by diversifying their livelihood options. However, there are still debates whether microfinance is really reduces poverty and contributes to improvement of livelihoods as envisaged in the literature without concurrent provision of basic social and infrastructural services (Sengupta and Aubuchon, 2008; Ebimobowei, Sophia, and Wisdom, 2012; Morduch and Haley, 2002). It is against this background that this study was conducted to present empirical evidence on the contribution of micro financial resources on the livelihood of the targeted beneficiaries in rural Eritrea.

1.2 STATEMENT OF THE RESEARCH PROBLEM

Eritrea, a relatively young country in the Horn of Africa became independent in 1991. It is one of the least developed counties in the world, with GNI per capita of US $680 in 2014 (World Bank, 2015). At independence, the Government of Eritrea (GoE) concentrated its efforts on meeting the emergency needs of the people, rebuilding and rehabilitating economic and social infrastructure and the institutions essential for achieving rapid economic and social development. By early 1993, Eritrea had managed to lay the basis for broad-based and sustainable growth and registered a growth in GDP of about 7 percent over the period 1993-97 and much progress was made in increasing access to education and health facilities and rural roads with significant positive impact on the living conditions of the people (GoE, 2004).

However, a border war with Ethiopia erupted in 1998 disrupted the initial progress and caused the destruction of economic and social infrastructure including roads, bridges, businesses, farms, schools, clinics and homes. Furthermore, the 'no peace no war' thereafter and prolonged drought have adversely affected the economy of the country. According to the National Statistics and Evaluation Office (NSEO, 2003)[1], 66 percent of the population was unable to obtain sufficient food (in terms of calories), and approximately 37 percent live under extreme poverty. In rural areas, about 65 percent of the population is unable to obtain sufficient food (in terms of calorie intake) and other essential goods and services to lead a healthy life.

A food security strategy paper prepared by the Government of Eritrea (2004) documents that the nature and magnitude of poverty is different in urban and rural areas. The rural people are more likely to fall into poverty owing to the fact that their source of income is less diversified, they are dependent on subsistence agriculture and thus more likely to be food insecure, low availability of infrastructure, problems related to accessing land, etc. are among the major challenges.

[1] Data are for the most recent year available during the period specified

This implies that the root causes of poverty are related to lack of opportunities and resources that locked the capabilities of poor people thus exposing them to shocks and vulnerabilities.

The contemporary Eritrean formal financial sector is characterised as small, state-owned, underdeveloped, uncompetitive and providing rudimentary banking services to the economy (Seghid, 2001; Making Finance Work for Africa, 2014; Nyend and Okumu, 2014; IMF, 2003). The majority of the Eritrean poor does not have access to these institutions. Because the poor is unable to provide collateral, they have no documented credit history and they lack basic management, accounting and financial literacy skills. It is, therefore, against this background that the Government launched a microfinance programme which provides small financial resources to the poor but its impact, strengths and limitations has yet to be systematically assessed and researched.

The Saving and Micro Credit Programme (SMCP) in Eritrea is a government institution which became operational in 1996. The main aim of the SMCP is to provide financial services to the vulnerable groups in both rural and urban areas of the country who have no access to formal banking services. It aspires to promote the private sector in Eritrea by encouraging the development and expansion of micro and small enterprises, to assist households and groups to increase their income generating ability, and to improve their earnings and the overall prosperity of their communities (Tesafamariam, 2004; SMCP, 2006).

Households participate in microfinance institutions in the expectation that borrowing will increase their income, smoothen consumption, enhance their food security, sustain self-employment, reduce the risk of vulnerability, increase savings, strengthen the basis for human capital formation, etc. Whether participation is in fact improving household livelihood, diversification and capability in rural Eritrea has not been properly investigated and understood well. Although the SMCP conducted an economic and social impact evaluation in 2006, the study lacked methodological rigor and was simplistic in its approach. Therefore, no systematic and comprehensive study measuring the impact of the SMCP at

household level has been done, particularly in rural Eritrea. It is in light of this context that the study intends to address the following research questions:

1. What are the characteristic features of rural livelihoods in Eritrea?
2. What factors determine household participation in the SMCP in rural Eritrea?
3. What is the impact of participation in the SMCP on household livelihoods in rural Eritrea?

1.3 OBJECTIVES OF THE STUDY

By addressing the research problem and answering the research questions, the study expects to achieve the following objectives.

The main objective of the study is to empirically assess and analyse the impact of the Saving and Microcredit Programme on selected livelihood indicators such as profit, food and non-food expenditure, asset possession, and household voluntary savings. However, the specific objectives are to:

i. Describe the assets owned, strategies pursued and outcomes achieved by rural households;
ii. Identify and examine the determinants of household participation in the SMCP in rural Eritrea;
iii. Assess the impacts of participation in the SMCP on livelihood outcomes of the targeted beneficiaries.[2]

1.4 SIGNIFICANCE OF THE STUDY

Public policy-makers and programme managers in general are keen to evaluate whether a particular intervention is effective in accomplishing its intended objectives. Result-based impact evaluation not only helps to track and measure programme or project targets but also

[2] A conference paper was prepared based on the results of this objective and presented at the 2015 Global Development Finance Conference organised by Africagrowth Institute and took place 29-30 October 2015, at Stellenbosch, Cape Town- South Africa. The conference paper is under review for publication in a conference book volume by Palgrave Macmillan.

improves accountability, informs budget allocations, and motivates evidence-based policy making decisions (Gertler, Martinez, Premand, Rawlings, and Vermeersch, 2011; Heinrich, Maffioli, and Vazquez, 2010). The provision of microfinance is a policy intervention that requires the supply of financial resources to achieve specific objectives. The SMCP is a government institution dedicated to meeting the financial needs of poor households to improve their well-being and general livelihood (Tesfamariam, 2004; SMCP, 2006). Therefore, the benefits of the programme in terms of improving the livelihood of the targeted population need to be studied so that policy-makers can determine whether their support of the programme is warranted.

At the macro level, the GoE is intensifying its efforts to expand and build infrastructure, social service facilities such as education, health, access to electricity, clean water in an attempt to reduce poverty in rural areas. Moreover, the incorporation of micro-level interventions through instruments like the provision of microfinance with the government's anti-poverty programmes could fill the gaps in our knowledge of what relevant policy measures work. Therefore, the study is expected to provide evidence to policy-makers so that an appropriate interventions and correct choices would be made with regard to allocating limited resources to an area where a real difference is possible.

Furthermore, while the study will have valuable insights to microfinance operations, and certainly serve to inform policymakers, microfinance institutions and development practitioners, the household-level impact of participation in microfinance is under-researched in the case of rural Eritrea. The empirical part of the study endeavours at clarifying the relationship between the multitude of socio-economic and demographic as well as village and programme level variables that determine rural households' participation in microfinance and how, in a rural context of Eritrea, access to a microfinance programme affects these selected dimensions of livelihood indicators. Last but essentially not least, recommendations and policy implications drawn from the study can inform policy makers in other low income countries with similar contexts.

1.5 SCOPE AND LIMITATIONS OF THE STUDY

The focus of the study is mainly on assessing the impact of microfinance on the livelihoods of households in rural Eritrea. Livelihood incorporates social and economic indicators. In this study the following economic indicators such as consumption expenditure, profit from microenterprises, asset possession, saving, and livestock possession are selected for estimation and discussion. The provision of financial resources is likely to affect the livelihood of the general community through its spillover effects. However, the study focuses on the impact of the SMCP on the prime group of beneficiaries compared to some comparison groups.

The study does not attempt to prove the impact of the SMCP on poverty alleviation, as it is quite difficult to demonstrate causality and attribution for the various projects that have been implemented simultaneously in the study areas. Moreover, the study neither attempts to address the implementation process and administrative mechanisms of the SMCP, nor does it measure the extent of outreach as it concentrates mainly on the outcome of the intervention variable. The thesis does not intend to study the sustainability of the institution itself; rather, it emphasises estimating the impact of the intervention programme on the beneficiaries of the SMCP.

1.6 THESIS OUTLINE

The rest of the thesis is organised as follows. Chapter 2 introduces the context, the structure and sectoral performance of the Eritrean economy and the operation of the SMCP in Eritrea. Chapter 3 reviews the existing literature on the link between the financial sector and economic development and goes down to review the impact of microfinance on the livelihood of households in detail. The Chapter has three sections, in which the first section presents a brief introduction; the second section elaborates the theoretical linkages between economic development, financial systems and microfinance exploring the finance-growth nexus in the development literature. The section also deals with the causes of financial market failures and compares how microfinance overcomes market imperfection observed in

developing countries, provides the multidimensional pathways around which microfinance could affect household livelihood in the form of reducing risks, diversification of income sources, consumption-smoothing, mobilisation of savings, employment generation, etc. Furthermore, the chapter highlights how microfinance contributes to livelihood development. The third section examines the empirical literature and outcome of microfinance impacts studies using various methodologies. Chapter 4 deals with the conceptual framework upon which the thesis depend for its line of argument and discussion of findings and the research design and methodology adopted for the study in terms of the sampling procedure, data collection instrument, methods of analysis, specification of the econometric model and definition of variables. Chapter 5 presents analysis of data and discussion of results. The descriptive statistics results and regression outputs were thoroughly discussed so that meaningful conclusion could be drawn. Chapter 6 concludes the main findings of the study in light of the research questions and objectives set out in Chapter 1. The chapter also outlines recommendations and presents suggestions for future research.

CHAPTER 2

THE ECONOMY AND THE FINANCIAL SECTOR IN ERITREA

2.1 INTRODUCTION

This Chapter presents an overview of the Eritrean economy, the performance of the financial sector as well as background and operation of the microfinance sub-sector. It also serves as a contextual background that motivates the need to conduct this study. The Eritrean economy is dependent on agriculture as more than 80 percent of the population derives their livelihood from the sector and yet its contribution to employment, income and food security is low. The financial sector development is at its infancy stage. The services and products of the formal financial institutions are limited both in terms of depth and breadth as they offer the basic and rudimentary banking services mainly to the major urban areas. Their outreach to the rural areas is hardly available for theoretical and practical reasons. To fill the financing gap and relieve the limitations of the formal banking sector to serve the poor in general and rural areas in particular, the GoE set up a microfinance institution known as the Saving and Microcredit Programme (SMCP) in 1996.

The Chapter has five sections. Section 2.2 introduces the profile of the country and highlights the structure and performance of the economy. It assesses the performance of the economy by briefly explaining the different sectors that make up the economy using the relevant macroeconomic and sectoral indicators. Section 2.3 briefly highlights the poverty situation in the country and captures the causes of poverty and the characteristics of the poor. The section also brings into the picture the efforts underway to reduce poverty particularly in the areas of health and education. Section 2.4 introduces the nature and contributions of the financial sector to the economy. Relevant financial development indicators were used to evaluate the level of development in the financial sector. The last section deals with the background and characteristics of the microfinance sub-sector in Eritrea focusing on the SMCP.

2.2 COUNTRY PROFILE AND ECONOMIC PERFORMANCE

2.2.1 Country profile

Eritrea is a country located in the Horn of Africa. It is bordered with the Red Sea on its east coast, Sudan to the west, Ethiopia to the south, and Djibouti at the extreme southeastern tip (World Bank, 1994). Eritrea has an area of 122,000 square kilometers (NSO, 2013). The foundation of the state of Eritrea came into being during the late 19th century when Italy occupied Eritrea. In 1890 Italy issued a decree which turned Eritrea into its colony that lasted up to 1941. Italy saw Eritrea as its most valuable colony, because among others, it wanted to be its gateway to Ethiopia. To this end, substantial economic development, particularly in infrastructure took place to meet the colonial needs of Italy.

In 1941, during the World War II, Italy was defeated by the Allied forces, and Britain took over the administration of Eritrea. In 1952, after 10 years of British colonial rule, Eritrea was federated with Ethiopia by the United Nations against the will of the Eritrean people. A decade later, Ethiopia abrogated the federal arrangement of the United Nations and annexed Eritrea as one of its provinces. This led to the Eritrean struggle for self-determination, which resulted in a protracted liberation war lasting from 1961 to 1991. Two years after the end of the war, and following an internationally supervised referendum to determine Eritrea's political status, 99.8 percent of the voters voted for independence. In May 1993, Eritrea formally declared Independence and became a member of the United Nations, and many other international and regional organisations. Eritrea's struggle for independence that lasted for three decades was one of the longest in Africa (World Bank, 1994; NSO, 2013).

No population census has ever been carried out in Eritrea. However, based on a population count by the Ministry of Local Government and NSO estimates, the total resident population was about 3.2 million as of 2010 (MND, 2010 cited in NSO, 2013). The majority of the population live in rural areas with about 78 percent of the population living in the countryside in 2010 (World Bank, 2013). Eritrea's population is diverse in cultural and linguistic terms. There are nine ethnic groups consisting of Tigrigna, Tigre, Bilen, Saho, Hedareb, Kunama, Nara, Rashaida, and Afar. About 50-60 percent of the population lives in

the highlands. Administratively, the country is divided into six zobas (regions): Anseba, Debub, Debubawi Keih Bahri, Gash-Barka, Maekel, and Semenawi Keih Bahri.

Eritrea is a land of varied topography, climate and rainfall. The main physiographical zones include the Red sea coastal plain including the Dankalia desert in the southeast; the highlands in the center of the country; and the western plains stretching towards the Sudan. Temperature varies with altitude: the mean annual temperature ranges from 16 -18°C in the highlands to 28°C in the lowlands to more than 30°C in the coastal plains (Ministry of Land, Water, and Environment, 1997, cited in NSO, 2013). Most of the western lowlands and coastal plains are associated with hot and dry climatic conditions, while the highlands are relatively cool. Eritrea lies in the Sahelian rainfall. The problem of inadequate rainfall is often compounded by the high variability and unreliability of both in terms of total rainfall and its distribution. In a normal year rainfall varies from 400 to 650 mm annually in the highlands and from 200 to 300 mm in the lowlands. During droughts, the rainfall levels can be as low as 200 mm in the highlands and less than 100 mm in the lowlands (World bank, 1994).

2.2.2 Structure and performance of the economy

The Eritrean economy is predominantly agrarian. Agriculture is the most important sector and it is critical to the livelihood of the vast majority of the Eritrean people. It is estimated that 70-80 percent of the population depends on the production of crops, livestock and fisheries for income, employment and food security (World Bank, 1994). Smallholders agriculture accounts for over 90% of agricultural outputs and over 80% of rural households own livestock. Land holdings are small and fragmented; average cultivated area per household in the highland and lowland part of the country is about 0.85 hectare and 1.45 hectare respectively (IFAD, 2011).

Although agriculture is the most important sector in terms of employment and livelihood, its contribution to the country's GDP is relatively moderate and estimated to be around 18 percent from 2000-2010 as shown in Table 2.1. The contribution of the agricultural sector to

GDP is characterised by ups and downs owing to the subsistence nature and excessive dependence on erratic rainfall. According to various reports, the share of agriculture to GDP has declined from 30 percent in 1991 to 16.9 percent in 2013 (UN 2001; African Development Bank, 2015). Agricultural production levels are generally low with average cereal yields per hectare lower than Sub-Saharan Africa. Agricultural productivity per worker is low due to shortages of complementary inputs and use of traditional farming practices. The contribution of agriculture to exports is also low with most of the exports coming from livestock such as sheep. Although a high proportion of the population is employed in agriculture, domestic food production has never been sufficient to feed the agricultural population. Even in the best of times where the country experienced good rainfall and input supplies, crop production can cover only 60-70 percent of the food requirement of the population (GoE and UN, 2005). Food imports therefore dominate the import items of the country.

Relative to its population, Eritrea could be considered well-endowed in terms of land size. The average population density is estimated to be 62 persons per km^2 in 2013 according to the world development indicators. However, the distribution of the population is uneven across the country. The highland and lowland parts of the country are characterised by varying degrees of population concentration and economic activities. For example, the central highland represents 16 percent of the total land area but because of its favourable climate, it is home for 65 percent of the total population. Sedentary farming along with small irrigated horticultural activities and semi-commercial dairy or poultry productions are mostly common agricultural practices in the highlands. The lowland area comprises the largest proportion of the total land area and pastoral and agro-pastoral activities with some irrigated commercial farming practices are common in these areas.

Because of the mountainous topographic features in the highlands and unsuitable climatic conditions in the lowlands, only 12 percent of the land is suitable for rain-fed agriculture (FAO, 1994 and MoA, 2002b). In 2009 around 6 percent of the total arable land was under cultivation which was slightly lower than Sub-Saharan Africa. While there is still the

potential to expand land cultivation in the lowlands, arable land in the central highlands is already exhausted to the extent that crop production has been extended to marginal lands.

The agricultural sector depends mainly on rainfall, with less than 10 percent of the total arable land currently irrigated. Livestock are important assets in rural areas and mainly comprises of cattle, donkeys, small stock, camels and poultry. Rainfed crops grown in the highland include sorghum, finger millet, taff, maize, barley, wheat and beans. Fruits (banana and citrus) and vegetables (onions, potatoes, tomatoes, pepper, lettuce, cabbage etc.) are largely produced in irrigated areas in the highlands. In the lowlands rainfed crops include sorghum, pearl millet, peas, beans, sesame and maize. Irrigated crops include fruits (water melon, banana, pumpkins) and vegetables (tomato, okra, potato, red onion). Table 2.1 shows the performance of agriculture in Eritrea in comparison to that of Sub-Saharan Africa.

Table 2.1: Selected agricultural development indicators

Indicators	**Eritrea**	**Sub-Saharan Africa**
Agriculture, value added (% GDP) 2000-2010[b]	18.2	15.8
Agriculture value added per worker (constant 2005 US$) 2009[a]	106.24	646.05
Rural Population (% total population) 2010[b]	78.4	62.7
Ratio of imports to exports of agricultural products 2009[b]	5.13	1.18
Ratio of imports to exports of food stuff 2009[b]	5.06	1.53
Cereal cropland (% land area) 2009[b]	4.6	4.0
Fertilizer consumption (kilograms per hectare of arable land) 2009[a]	2.78	12.51
Cereal yield (kg per hectare) 2009[b]	536	1336
Arable land (% of land area) 2009[a]	6.83	8.45

Source: [a] World Bank, World development indicators, 2015
[b] World Bank, 2013

A study made by IFAD (2011) documented that the major constraints for agricultural development are: poor access to modern inputs, inadequate technical skills, low and erratic rainfall, limited soil fertility, land degradation, and weak institutional capacity – particularly concerning technology generation and dissemination. Notwithstanding these limitations, there are good opportunities for agricultural development based on adoption of proven and affordable technologies, production and distribution of improved seeds, expanded and

improved irrigation, innovative approaches to soil and water management and promotion of sustainable natural resource management.

The other sector that is expected to lead the growth process is the industrial sector. Industrial development in Eritrea began during the Italian colonial period (1890 to 1941), when a large number of firms were established in light manufacturing (food and beverages) and construction materials (cement, brick, and tiles). However, the 30 years' war for Independence and subsequent policies of colonial regimes had caused a complete collapse of the industrial sector.

Currently the manufacturing sector in Eritrea consists mainly of light manufacturing industries producing a variety of goods including processed food, beverages, leather and leather products, textiles and garments, wood and wood products; basic metals, nonmetallic and mineral products, chemical products including plastics and rubber, fabricated metals, and construction materials, etc. The contribution of the manufacturing sector in terms of employment, value added, and share of GDP is small reflecting the stagnation of the sector.

Table 2.2: Performance of the manufacturing sub-sector

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Manufacturing, value added (% of GDP)	10.09	9.90	9.33	7.31	6.35	5.71	6.76	5.65
Chemicals (% of value added in manufacturing)	8.34	7.68	7.14	7.59	10.09	5.24	10.64	6.71
Food, beverages and tobacco (% of value added in manufacturing)	48.46	49.63	49.53	42.91	34.83	43.61	0.46	40.23
Machinery and transport equipment (% of value added in manufacturing)	1.69	2.20	1.66	2.26	4.23	1.40	1.32	0.33
Textiles and clothing (% of value added in manufacturing)	11.75	9.34	9.99	11.78	16.46	18.62	31.22	20.01
Other manufacturing (% of value added in manufacturing)	29.76	31.15	31.68	35.46	34.39	31.14	56.37	32.72

Source: World Bank, world development indicators, 2015

As shown in the Table 2.2 the contribution of the manufacturing sector (in terms of value added) to GDP is less than 10 percent in 2009 and it has been steadily declining since 2002. The manufacturing sector itself is not diversified and it is concentrated in food, beverages

and tobacco which account the highest percentage in terms of its contribution to the total manufacturing sector. Machinery and transport equipment which are critical in the process of development account negligible contribution to the sector.

According to the survey conducted by Cotton, Haile, Marchat, Miovic, Paton, Ramachandran, and Shah (2002), and World Bank (2001), the manufacturing sector absorbed only 1.3 percent of the labour force in 1999. The textile, leather and garment industries accounts the highest employment (45 percent) followed by food and beverages which accounts for 25 percent in 2001.

In general, the industrial value added which comprises value added in mining, manufacturing, construction, electricity and water accounted an annual average of 18.4 percent as a share of GDP from 2000-2010 (World Bank, 2013). This was lower than Sub-Saharan Africa as a whole which contributed an annual average of 29.6 percent over the specified period of time.

The UN (2001) report indicates that the share of the industrial sector to GDP had increased from 15 percent in 1992 to 28.9 percent in 2000. Although the progress of the sector has been adversely affected by the border conflict and the 'no-war-no-peace' situation thereafter, it is gradually taking a greater share of Eritrea's economy. The African Economic Outlook (2012) estimated the contribution of the sector to be around 24.1% share of GDP in 2011. The World Bank report on Eritrea (2013) indicates that the share of the manufacturing sector to GDP was 26.9 percent in 2013. However, such growth was largely driven by the mining sector as well as by the on-going public construction work.

Despite its importance as a dynamic sector and its expected role in the economic growth of the country, the manufacturing sector faces a formidable challenges and constraints. Macroeconomic instability reflected in the form of inflation, lack of foreign exchange and exchange rate instability, shortage of skilled labour, consistent disruptions of water and electricity supplies, lack of access to finance, lack of access to land, and other necessary inputs are some of the highly rated problems facing the sector in Eritrea (Cotton, *et al.*, 2002,

World Bank, 2009). The poor performance of the agricultural sector was also believed to have deprived the industrial sector from being a reliable source for the supply and procurement of raw materials, as well as capital, usually generated in the farming sector, for investment in non-farm enterprises. The domestic market for goods and services being produced in the country is also very limited as a result of the low purchasing power of the farming community and widespread poverty in the rural population (UNIDO, UNDP, and MTI, 2004).

The low level of industrial performance can easily be explained by looking at the export items the country trades with the rest of the world. The export items include mainly primary products such as live animals and animal products, vegetable products, mineral products, and textiles, etc. for which their income and price elasticity of demand in the world markets is low. However, the composition of Eritrea's exports is changing, and is now being dominated by mineral resources (gold and copper, with exploration for potassium taking place). As indicated in Table 2.3 the share of exports as a percent of GDP rose markedly in 2011 and has been moderately increasing since then though still lower than Sub-Saharan Africa, and the outlook depends on the stability of prices and economic conditions at the main destinations of exports. Imports, amounting to a high 41.6 percent of GDP during 2004-2008 have stabilised in the range of 23-24 percent of GDP since 2009 (African Economic Outlook, 2014).

Table 2.3: Selected macroeconomic indicators

Indicator	Eritrea							Sub-Saharan Africa
	2004-2008	2009	2010	2011	2012	2013	2014	2014
Real GDP growth (percent)	-1.1	3.9	2.2	8.7	7.0	1.3	2.0	5.1
Real per capita GDP growth (percent)	-4.7	0.6	-1.1	5.2	3.6	-1.9	-1.2	2.6
Consumer prices(Annual average, percent change)	16.4	33.0	12.7	13.3	12.3	12.3	12.3	6.7
Exports of goods and services (percent of GDP)	5.8	4.5	4.8	14.4	19.1	17.3	19.5	27.5
Import of goods and services (percent of GDP)	41.6	23.4	23.3	23.2	22.8	22.1	24.0	30.2
Trade balance on goods (percent of GDP)	-33.9	-19.9	-19.6	-10.3	-4.6	-5.5	-5.0	2.2
External current account (percent of GDP)	-3.1	-7.6	-5.6	0.6	2.3	0.3	0.2	-2.6
Reserves (months of imports of goods and services)	1.0	2.2	2.3	2.0	3.4	3.4	-	5.2 (2013)

Source: International Monetary Fund, 2014

Eritrea's trade position has been characterised by consistent deficits. The constraints facing the manufacturing sector can be attributed as the major bottlenecks of the trade sector. Moreover, infrastructural deficiencies, institutional-capacity weaknesses, governance challenges, and unresolved regional instability and conflict issues can be mentioned as additional challenges. These constraints have resulted in Eritrea's having little interregional trade with COMESA countries representing only 20% of total trade. In 2009, Eritrea launched a free trade zone in the port of Massawa to attract foreign investment, within which it has removed all potential trade barriers such as taxes and quotas, and facilitated favourable regulatory procedures (African Economic Outlook, 2014). The external current account is slightly improving mainly due to transfer payments such as remittances. As a result, the amount of reserves measured in terms of months of imports of goods and services is getting momentum though lower than the Sub-Saharan Africa average in 2013.

Eritrean exports are geographically less diversified and are restricted in few products. The export and import indices of Eritrea which measures the degree of diversification and concentration as reported by Africa's development indicators 2012/2013 shows a substantial divergence. The export diversification and concentration index in 2010 was 0.12 and 0.65 in a scale of 0-1 respectively. This means that Eritrea's exports were less diversified in terms of geographic destination and were concentrated in few products. For Sub-Saharan Africa, the export diversification and concentration index over the same period was 0.39 and 0.58 respectively. For example the top destinations for Eritrea's export in 2012 include UAE, Italy, China, and Saudi Arabia. Similarly import diversification and concentration index for 2010 was 0.11 and 0.53 which was relatively higher than Sub-Saharan Africa which was 0.09 and 0.29 over the same period of time (World Bank, 2013).

The service sector dominates Eritrea's economy with a share of 58.9 percent of GDP in 2011 and estimated to be 61.4 percent of GDP in 2013 (World Bank, 2013). Growth in this sector was largely contributed by public administration, transport, storage and communications, as well as by wholesale and retail trade, restaurants and hotels.

Since independence, the Eritrean economy has never enjoyed stability due to internal and external factors. At independence, the government of Eritrea inherited a devastated economy and infrastructure, a large exiled population, and an empty treasury. The rehabilitation and reconstruction of the war-torn economy was a top priority. To this end, the government immediately assessed the emergency situation of the country and identified the main problems and constraints and mapped out measures needed to alleviate them by designing methods of reconstruction and development. As a short-term strategy, the government formulated and prioritized immediate national recovery and rehabilitation programme for Eritrea (RRPE). As a long-term strategy, a Macro Policy of 1994 was formulated laying down the building blocks for comprehensive and broad based economic and social development. Other policies (such as the National Economic Policy Framework and Programme, 1998-2000; the Transitional Economic Growth and Poverty Reduction Strategy, 2001-2002; the Interim Poverty Strategy Paper (I-PRSP), 2004; the Food Security Strategy Paper (FSSP), 2004) communicate the government's long-term objectives of poverty reduction through rapid economic growth and accelerated

human development. During the brief peace time of 1993-1997, the economy grew by 7.4 percent, inflation was kept below 5 percent, and Eritrea had accumulated foreign reserves that cover seven months of imports (GoE, 2005). During this period, the economy has experienced a relatively high degree of macroeconomic stability with single digit inflation. This was supported by a combination of favourable supply conditions, including strong agricultural production and sound macroeconomic policies (GoE, 2005; IMF, 2003).

However, the border war with Ethiopia that erupted in 1998 and ended in 2000 and the no-war-no-peace situation thereafter, has caused substantial displacement of the Eritrean population, destroyed the socio-economic infrastructures in the areas affected by the war, and derailed the momentum of development witnessed during the brief peace time. Moreover, the country has been suffering from recurrent drought which adversely affected its agricultural productivity. As a result, financial and human resources were diverted to defense, production fell down, investment crippled and the economy has entered into recession. According to the World Bank (2015), GDP growth rate declined tremendously from 7.9 percent in 1997 to -3.3 percent during the time from 1998-2000.

As shown in Table 2.3, the economy took some time to recover and the average growth rate of GDP from 2004-2008 remained -1.1 percent and inflation spiked to reach its highest value in 2009. However, since 2009, the economy witnessed a positive growth with ups and downs in the growth rate of GDP though lower than the growth rate observed in Sub-Saharan Africa in 2014 and the inflation rate declined since 2010. The trend in the rate of growth was attributed mainly due to the expansion of mining activities and public investment on public infrastructural programmes. The African Economic Outlook (2012), reports that the expansion of the mining sector with substantial foreign investment has been a key stimulant to growth.

2.3 THE NATURE AND CAUSES OF POVERTY

Microfinance programmes have been acknowledged as effective instruments for poverty alleviation particularly in developing countries (Corrie, 2011; Tend, Prien, Moa and Leng, 2014). Poverty is multidimensional involving income or consumption poverty as well as lack

of social services which directly or indirectly contributes to marginilisation and powerlessness on the part of the poor. The availability of social services including basic education, health care and infrastructure would serve as a catalyst for microfinance programmes to have meaningful contribution to poverty reduction. This section highlights the poverty profile in rural Eritrea so that we could appreciate the impact of the SMCP in rural livelihood.

Eritrea is a poor country with an estimated annual GNI per capita of about US$ 680 per capita in 2014 (World Bank, 2015). The border war and its subsequent adverse effects on the economy and the recurrent drought have aggravated the poverty situation. The war destroyed economic and social infrastructure including roads, bridges, businesses, farms, schools, clinics and homes. It displaced over one million people, mainly farmers, the elderly, women and children.

In order to fully understand the degree and extent of the overall poverty situation in the country, the GoE conducted two national household surveys in 2003 namely, the Household Living Standards Measurement Survey (LSMS) by NSEO and PPA led by a team of Eritrean consultants. The national household survey also made use of other two complementary surveys such as the second EDHS also conducted by the NSEO in 2002 and the Rural Livelihood Security Assessment (2003) conducted by ERREC, WFP and CARE Eritrea. The poverty assessment and estimates used are therefore those surveyed in 2003.

The results show that when measured in terms of consumption poverty, 66 percent of the surveyed respondents were considered poor unable to obtain sufficient food (in terms of calories) and other essential goods and services to lead a healthy life and among which 37 percent were in extreme poverty (NSEO, 2003)[3]. The findings show that poverty is concentrated in rural areas with 65 percent of the population unable to command sufficient food and other essential goods and services. There is significant variations in poverty incidence among the regions (Zobas) in Eritrea where the Northern Red Sea and Anseba regions having the highest poverty followed by the Southern Red Sea region.

[3] Data are for the most recent year available during the period specified.

The socio-demographic dimension of the poor shows that, the poor particularly the rural poor are found to have a larger family (6 persons on average) which is higher than the national average family size which is 5.1 persons. The non-poor families have on average 4.2 persons. Households headed by women are poorer that those headed by men. The survey shows that about 30 percent of the households are headed by women, of whom 18 percent are widows - the legacy of long years of war for independence and subsequent border conflict with Ethiopia. The findings by (CARE, WFP, & ERREC, 2003) shows that half of the households that are female headed are classified as poor and their livelihood status is worse having fewer livelihood options.

The economic characteristics of the poor reveal that the majority of the rural poor are predominantly dependent on agriculture for their livelihood and face a high frequency of food insecurity. Land ownership is an important asset in rural areas and determines the extent of poverty. In rural areas, the poor households in the highlands cultivate only 0.9 hectare of land, less than the national average of 1.1 hectare for each household. The small ownership of land limits their ability to diversify their agricultural production and thus make them susceptible to economic shocks. Furthermore, they have poor access to farm inputs such as improved seeds, fertilizer, irrigation facilities and agricultural training and extension services which further limits output per unit of land. Moreover, according to the World Bank (1996), the rural poor face a high risk of income fluctuations because their income sources are not diversified.

The women headed households in rural areas are mainly poor because the majority of them are engaged in low-paying manual labour in agriculture and informal sector of the economy. Furthermore, female-headed households have fewer household assets including livestock. As far as the distribution of consumption is concerned, the ratio of share of consumption by the richest quintile (top 20 percent) to that of the poorest quintile (bottom 20 percent) is 6.8 which is relatively high. The World Bank (1996) estimates that the non-poor have 3-4 times higher income from crops and livestock. The report further state that on average, non-poor rural household owns 7 livestock units compared to 2 units by a poor household.

Income and consumption poverty as described above represent only one aspect of poverty. Social indicators tell the other part of the story. Low levels of income and consumption as indicators of poverty have ramification effects on social dimensions reflected in terms of poor health, nutrition, low literacy, etc. The interlocking relationship between economic and social aspects of poverty explains the multidimensional nature of poverty. For example poor health, the prevalence of diseases, and poor nutrition can prevent people from working full time, limiting their income and their ability to work to move out of poverty. The poor without formal education and inadequate skills are more likely to hold poorly paid jobs or to be unemployed and less likely to send their children to school which amounts to intergenerational transmission of poverty.

Since the publication of the national household surveys in 2003, Eritrea has registered significant achievements in the social sector indicators. Since independence and particularly in the past 10 years, much progress has been achieved in expanding access to basic social services particularly in the health sector. According to the MDGs report jointly released by the GoE and UN, infant mortality rates per 1,000 live births reduced from 92 in 1990, to 58 in 2000, to 37 in 2012. Under-five mortality rate per 1,000 live births reduced from 150 in 1990, to 89 in 2000, to 50 in 2013 (UN and GoE, 2014 cited in WHO, 2014 and UNICEF, 2014).

Immunization coverage against major child diseases such as diphtheria, tetanus, hepatitis, measles increased from 10 percent in 1991 to 98 percent in 2013. Furthermore, maternal mortality ratio per 100,000 live births declined from 1,700 in 1990, to 670 in 2000, and 380 in 2013 for which Eritrea has already exceeded its MDG-5 target of 425 per 100,000 live births by 2015 (WHO, 2014). The prevalence of HIV as documented by the NSO (2013) is 0.93 percent although women are more than two times as likely to be infected with HIV as men. Malaria control has significantly increased. In 2008 for example malaria accounted for just one percent of all deaths among children under-five years of age. Morbidity and mortality due to malaria has declined by more than 85 and 90 percent respectively.

According to reports by WHO 2014, the incidence of malaria in 2012 was 1282 cases per 100,000.

Life expectancy trends are usually taken as a summary indicator of many health indicators. According to WHO (2014), life expectancy at birth increased significantly from 48 years in 1990 to 63 years in 2012 which is higher than the regional average which is 58 years. The improvement in life expectancy is attributed partly due to reductions in infant and child mortality, as well as the reduction in adult mortality due to control of malaria and other communicable diseases.

Eritrea has also made notable progress in terms of reducing illiteracy particularly in adult education. The country's adult literacy rate has improved from 43.5 percent in 1991 to 80 percent in 2013 which places the country among the top 10 in Africa (UNICEF, 2013).

These substantial achievements in the health and education sectors will have far reaching implication in poverty reduction through a multiple of interrelated linkages. Improvements in child and maternal health will improve the attendance and performance of students in schools, reduce expenses for health related problems, increase productivity, reduces inequality and the likelihood of intergenerational poverty.

2.4 FINANCIAL SECTOR DEVELOPMENT

Eritrea inherited its financial sector from Ethiopia at liberation in May 1991. Since independence, the financial system in Eritrea underwent considerable reforms with the aim of revitalising and restructuring of the formal financial structure in line with its economic policy manifested in its 1994 Macro-economic Policy issued by the government (GoE, 1994).

When Eritrea became independent, a new central bank- the Bank of Eritrea (BoE) was established to replace the former branch office of the Central Bank of Ethiopia. However, until 1997 Eritrea was in a de facto currency union with Ethiopia, which limited its scope for an independent monetary policy. Thus, monetary policy decisions by the bank were largely

restricted to aspects of interest rate, reserve requirement regulations and banking supervision. In 1997 Eritrea introduced its own currency, the Nakfa, and the BoE became the central bank. The enactment of the BoE's proclamation (GoE, 1997) and Financial Institutions' proclamation (GoE, 1997) substantially transformed the role of the bank. Immediately after its enactment the bank took steps to improve its regulatory and supervisory capacity (Seghid, 20011; World Bank, 1994).

At present, the financial sector comprises the central bank- Bank of Eritrea (BoE); and two commercial banks, i.e. the Commercial Bank of Eritrea (CBE) and the Housing and Commerce Bank of Eritrea (HCBE). Also, it has one development bank, the Eritrean Development and Investment Bank (EDIB), and one insurance company, the National Insurance Corporation of Eritrea (NICE). The contemporary Eritrean formal financial sector can be characterised as small, state-owned, underdeveloped, uncompetitive and providing rudimentary banking and other financial services to the economy (Seghid, 2001; Making Finance Work for Africa, 2014; Nyend and Okumu, 2014; IMF, 2003).

The CBE is the largest state owned commercial bank in the country, chartered by the government to accomplish a wide range of banking activities that include handling demand deposits, saving and time deposit accounts, and forwarding credit. The CBE dominates the banking business in the country with more than 90 per cent of the country's deposits (UN, 2001) and 73 percent of the market share in terms of asset possessions. At present the bank has 14 branches in the major towns throughout the country (BoE, 2014).

Table 2.4: Market share of banks in terms of asset possession (percentage)

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
CBE	78.24	80.70	79.75	79.13	79.58	77.29	77.38	75.88	74.62	74.79	73.61	73.53
HCBE	20.71	18.23	19.12	19.76	19.44	21.82	21.97	23.57	24.71	24.61	25.77	25.98
EDIB	1.05	1.07	1.13	1.11	0.98	0.89	0.65	0.55	0.67	0.60	0.62	0.59

Source: Bank of Eritrea, 2014

Note: CBE-Commercial Bank of Eritrea; HCBE -Housing and Commerce Bank of Eritrea; EDIB- Eritrean Investment and Development Bank

Market share could be used as an indicator of concentration and competition in the banking sector. It measures the degree to which the financial sector is dominated by the biggest institutions in the market (IMF and World Bank, 2005). Table 2.4 shows that even though the market share of the CBE in terms of asset possession is declining, it still dominates the banking business. The HCBE's market share is growing overtime but with sluggish percentage increase. The main objectives and functions of the HCBE include accepting demand deposits, saving and time deposits; providing long-term loans for construction or for acquiring residential housing, buildings, infrastructure, as well as providing short-term loans for maintenance and repairs of dwellings. Currently the HCBE has 11 branches over the major towns of the country. Although the EDIB was established in 1996 with the objective of promoting and accelerating the country's economic development by providing development finance to viable development-oriented projects in the agricultural, industrial and other sectors of the economy, its presence in terms of asset possession and geographic coverage is extremely limited with only one branch at the headquarters in the capital city-Asmara.

A commonly used measure of market concentration is the Herfindahl-Hirschman Index (HHI). It is calculated by squaring and summing the market shares of each firm in the market. The index by comparing to a certain benchmark indicates the market power and competitiveness of the banking sector (Bikker and Haaf, 2002). The HHI for the three banks in Eritrea is provided in Table 2.5.

Table 2.5: HHI index of the banking sector in 2013

Bank	**Market share (%)**	**Market share**
CBE	0.73	0.5329
HCBE	0.25	0.0625
EDIB	0.0059	0.00003481
	HHI	**0.5954 ≈ 0.60**

Source: Bank of Eritrea, 2014

A HHI below 0.01 shows a highly competitive market. A HHI value of 0.09 to 0.1 indicates unconcentrated market. A moderate market concentration is given by the HHI value between 0.1 and 0.18. A HHI value above 0.18 is an indicator of high market concentration.

Therefore, as shown in Table 2.5 the banking sector in Eritrea is characterised by high market concentration or equivalently lower competition as indicated by the HHI of 0.6. A substantially higher market share dominated by one bank (CBE) proves this concentration.

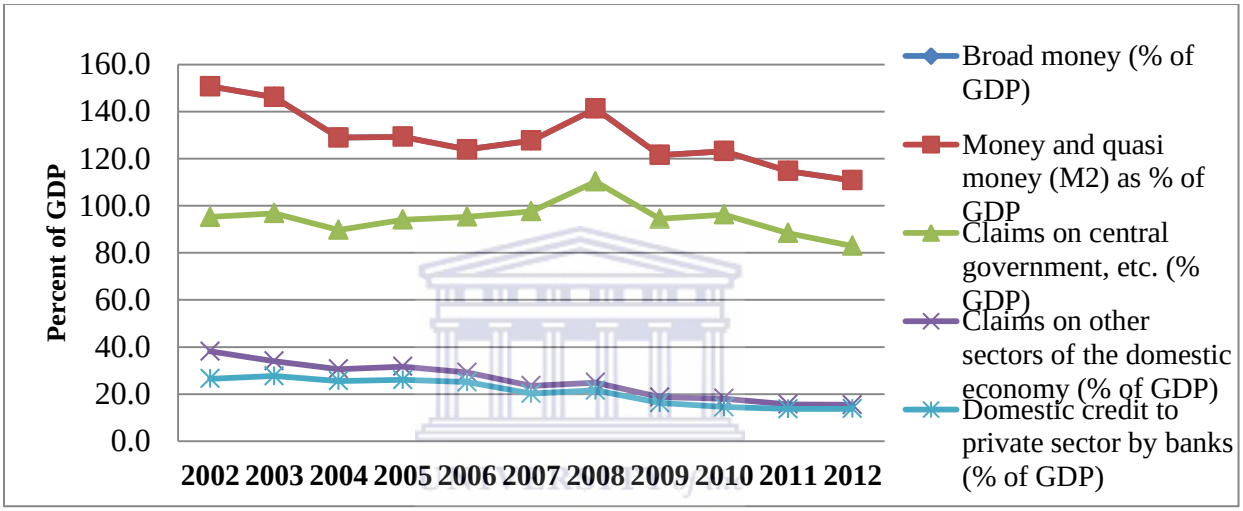
The low development of the financial sector in Eritrea can also be seen from its limited provision of financial services and products. According to World Bank and IMF (2005), a well-functioning financial system is characterised by its provision of a variety of financial services and products that best suits savers and investors. It should be able to offer a wide range of financial instruments and products that provide alternative rates of return, risk, and maturities to savers and alternative sources of financing at varying interest rates and maturities for investors. However, the financial services offered by formal banks in Eritrea is limited to basic services such as accepting deposits, facilitating payments, forwarding credit for a variety of purposes, short and long-term savings. The banks' services are also limited in terms of outreach. The small numbers of branches are concentrated in major urban centers. The rural areas do not have access to such institutions.

The determination of the interest rate and the spread between the deposit and lending rate is another criterion for assessing the bank's market power. The margin between the lending and deposit rate has implication for saving and investment and thus for economic growth. According to Folawewo and Tennant (2008), interest rate spread has important implication for economic growth through its effects on the efficiency of bank intermediation. An efficient banking system should transfer funds from surplus agents to deficit agents and in doing so it should offer higher expected returns for savers and lower borrowing costs for investors. A large interest rate spread potentially discourages savers by reducing the returns on deposits and thus limits the funds available for borrowers. Large margin means higher intermediation costs and higher bank inefficiency.

In the case of Eritrea the interest rate is fixed. Different sectors are charged different interest rates. The interest rate on loans for various sectors of the economy is determined by the two major banks namely the CBE and HCBE based on periodic consultation with the Bank of Eritrea (UN, 2001). The current maximum interest rate on loans ranges from 8 to 12 per cent

per annum depending on the type of security and type of business. On the other hand, the current interest rate on saving deposits is 2 per cent, while the interest rate for time deposits ranges from 2.5 to 3.0 percent (BoE, 2014). The average interest rate spread since 1996 ranges from 5.25-6.65 percent. Although this is lower compared to Sub-Saharan Africa, given the inflation rate, the deposit rate in real terms is negative which negatively affects potential savers.

Figure 2.1: Eritrea's selected financial development indicators



Source: World Bank- world development indicators, 2015

Financial sector development is an integral part of the overall economic development. A developed financial sector facilitates the exchange of goods and services, the mobilisation and allocation of resources as well as the diversification of risks. Monetary and credit aggregates have been used as proxy indicators of financial sector development. Narrow and broad money aggregates, credit allocation to the different sectors of the economy as well as claims on government and other sectors of the economy measures the extent of financial deepening and public and private sector borrowing from the financial system (Gelbard and Leite, 1999).

The ratio of money to GDP measures the extent of financial deepening and degree of monetisation in the economy. For example the narrow definition of money (money and quasi

money) reflects money as a payment mechanism whereas broad money indicates money serving as a saving mechanism. In a growing economy, transaction of goods and services is expected to increase and thus money and quasi should rise in line with the volume of transaction but for financial deepening to occur, broad money should rise faster (Lynch, 1996). The growth of broad money to GDP ratio shows the development of the financial sector. Higher broad money to GDP ratio reflects the extent of resource mobilisation in the form of savings which could be made available for allocating credit to the different sectors of the economy.

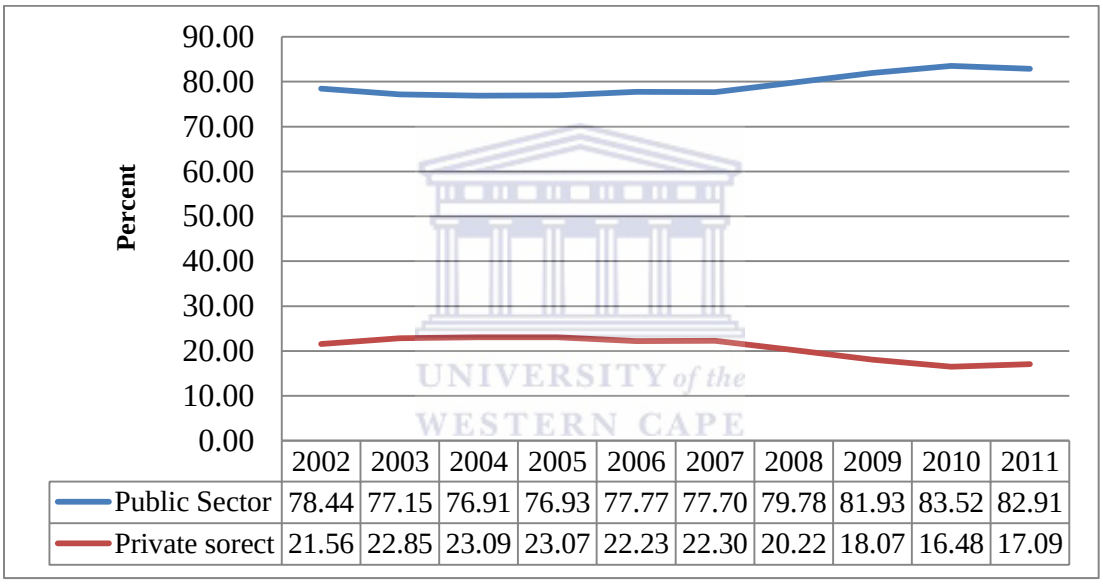
The financial sector in Eritrea is in its infancy stage dominated by higher money and quasi-money to GDP ratio as shown in Figure 2.1. It lacks financial deepening and is characterised by low credit intermediation. Borrowing from the domestic financial sector is mainly dominated by the public sector. In Figure 2.1, there appears a huge divergence between the claims on the central government and other sectors of the domestic economy measured as a percentage of GDP. Another common measure of financial development is the credit provided to the private sector by banks. The provision of credit has critical importance for any economic activity. Households borrow for smoothing their consumption and firms borrow to finance their investment. Domestic credit to the private sector shows the financial resources provided to the private sector. The declining trend in the ratio of private sector credit to GDP as shown in the figure 2.1, therefore, indicates the shallowness and lack of depth in the financial sector.

Assessing the sectoral distribution of credit to the private sector could help to evaluate the alignment of bank credit with the distribution of domestic output. The relative share of credit allocated to agriculture, manufacturing and services could show the adequacy of credit provided to the economy (World Bank and IMF, 2005). Judging from such perspectives, the loan portfolio particularly of the CBE consists of mainly short-term loans, which it considers as less risky. The loans are mainly targeting domestic trade and services, and larger state-owned and private manufacturing firms, which are considered to be relatively low-risk customers. Collateral is a requirement for all the banks thereby limiting the ability of small investors to capitalise on business opportunities. The banks do not usually lend to small

entrepreneurs, to people in the informal sector and to small-scale farmers, since they are considered to be high-risk borrowers. Moreover, the high cost of borrowing and the difficulties of having appropriate collateral have inhibited these microentrepreneurs from applying for credit at these institutions. Indeed, the low productivity and lack of collateral in these subsectors make them not very appealing clients for the formal financial institutions.

Comparison between the private and public sectors shows that, the public sector received a lion's share of the available credit as shown in Figure, 2.2.

Figure 2.2: Percentage allocation of domestic credit by sector



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Public Sector	78.44	77.15	76.91	76.93	77.77	77.70	79.78	81.93	83.52	82.91
Private sorect	21.56	22.85	23.09	23.07	22.23	22.30	20.22	18.07	16.48	17.09

Source: Bank of Eritrea, (2014)

One of the characteristics of a developed financial sector is its provision of easy access to investment financing for the private sector. An efficient financial system reduces the dependence on internal and informal sources of finance by enabling investors to access bank credit. Excessive reliance on internal and private source of finance is therefore a sign of potentially inefficient financial intermediation. The World Bank enterprise survey conducted in Eritrea in 2009 shows that more than 95 percent of firms in Eritrea depend on internal financial resources (own, family, and informal funds) for financing enterprise creation and expansion which is also higher than Sub-Saharan African and low income countries (World

Bank, 2009). The low consumption of bank credit by the private sector as shown in figure 2.2 could thus be attributed to the burden imposed by loan requirements measured by collateral levels relative to the value of the loans and the high cost of credit by the banking sector.

Besides the poor credit flow to the private sector, the majority of the Eritrean poor also does not have any access to the formal financial institutions. This is because the poor are unable to provide collateral, they have no documented credit history from the formal financial sector and they lack accounting records, and lack basic financial literacy skills. Moreover, the Eritrean informal financial market cannot meet the credit needs of the poor because of the sectors inherent limitations. Furthermore, as the majority of the Eritrean population depends on subsistence agriculture, the lack of significant monetization of economic activities that take place outside the formal financial institutions has been its defining characteristics (Tsegai, 1999).

On top of the above objective realities, the formal financial institutions face formidable informational problems which results in adverse selection and moral hazard outcomes to extend credit to rural areas. The problem of information and subsequent imperfections in the credit market will be reviewed in detail in Chapter three. In this Chapter, it suffice to note that formal banks reluctance to provide credit to the poor and rural areas stems from the lack of information and high transaction costs in the form of monitoring and enforcement for the banking sector which affects its returns and profitability.

It seemed that the government of Eritrea recognised the shortcomings of the Eritrean formal financial sector and therefore launched microfinance programmes early on, which provide financial resources and services to the poor. It is behind this background that the microfinance institutions have started to become active in Eritrea.

2.5 THE MICROFINANCE SUB-SECTOR

At present the largest and dominant microfinance institution operating in Eritrea is known as the Saving and Microcredit Programme (SMCP). It began in 1996 as a component of the

Eritrean Community Development Fund (ECDF). The ECDF was established in 1993 as part of the broader Recovery and Rehabilitation Programme of Eritrea (RRPE). The RRPE was initiated by the Government of the State of Eritrea to support the rehabilitation and reconstruction of basic social and economic infrastructures with the ultimate goal of alleviating the widespread poverty in the country. The government of Eritrea, the World Bank, loans and grants from bilateral donors and organisations were the main sources of funds for ECDF. The ECDF was designed to promote community development and to strengthen the capacity of local communities to identify and execute their development priorities, manage project implementation, and maintain community assets. The ECDF interventions have benefited about one third of the population in 1996 of which 50 percent were women. The project provided an important platform for harnessing local inputs in local development efforts, strengthened the capacity of communities to manage and implement their own development priorities, enhanced regional and local government's approach to community development (World Bank, 2002).

Currently the SMCP functions as a semi-autonomous microcredit programme working under the auspices of the Ministry of National Development (MND) of the Government of Eritrea (SMCP, 2006). The main aim of SMCP is to provide credit services to the vulnerable groups in rural and urban areas who are unserved and underserved by the formal financial institutions. The SMCP aspires to promote the private sector in Eritrea by encouraging the development and expansion of micro and small enterprises and assist individuals and groups to increase their income generating ability and improve their earnings and food security.

The SMCP uses group and individual based loan products to better serve the preferences of its customers. Since its inception in 1996, the SMCP has been following a tier based loan products where clients are classified into two tiers, namely, Tier I and Tier II mainly on the basis of the amount of loan disbursed. This classification has been in operation till 2007. After 11 years in business and the lessons learned and experiences gained in those years, the SMCP recognised the need to revise its existing loan products and introduce new ones along with loan ceilings to achieve its intended objectives and better serve the needs of its clients.

Since 2008 therefore, the SMCP has been extending loans according to the revised loan products and ceilings as expressed in Table 2.6.

The adjustments made thus far show that the SMCP has been making an effort to develop a product mix that is tailored to meet the needs of the target population by refining its product offerings in line with clients' preferences.

Table 2.6: Loan product classification

S.No	Type of product	Mode of loan provision	Range of loan amount in Nakfa	Range of loan cycle	Loan term	Payment mode
1.	Micro-business loan (MBL)	Solidarity Group	3000-20000	1-6	12 months	Monthly
2.	Small scale agricultural loan (SSAL)	Solidarity Group	3000-9000	1-3	Six months	Quarterly
3.	Oxen loan (OL)	Individual	Up to 10000	One-time	Six months	Quarterly
4.	Small business loan (SBL)	Individual	30000-80000	1-3	Based on feasibility study	Monthly
5.	Irrigated agricultural loan (IAL)	Individual	30000-80000	1-5	Based on feasibility study	Quarterly
6.	Employee loan (EL)	Individual	Up to 20000	One-time	24 months	Monthly

Source: Triodos Facet, (2007)
Note: Official exchange rate – 1USD=15 Nakfa

The loan products of the SMCP are designed in such a way to support the investment activities of enterprises, create new income and employment activities in poor communities whose livelihood is dependent on agriculture, contribute to the improvement of living standards and increase the overall prosperity of these communities.

As shown in Table 2.6, currently the SMCP runs six loan products each of which targeting various socio-economic classes of clients. The Micro-Business Loan (MBL) covers all unlicensed and unregistered informal economic activities including petty trade, vegetable vending, selling traditional brew, establishing small retail kiosks, buying and selling of small

and short cycle livestock such as poultry, sheep and goats with the objective of complementing crop production and supplementing household income. The MBL can be accessed only through the formation of solidarity groups at the village level.

The Small Seasonal Agricultural Loan (SSAL) is accessed through solidarity groups and aimed at enabling farmers obtain the necessary agricultural inputs such seeds, fertilizer, agricultural implements during the farming season and fattening of small and short cycle livestock activities. This loan product targets small holder farmers to finance agriculture related activities to boost their productivity and thus improve their agricultural income and food security. The Oxen loan (OL) product is an individual based loan with the primary objective of enabling small farmers purchase ox during the farming season. This loan product serves the idea that small farmers should not remain idle during the agricultural season for lack of ox. Although the amount earmarked for this purpose is not sufficient to buy an ox which is around 20,000 (twenty thousand) Nakfa at the time of data collection for this study, the idea remains that two or more farmers can either combine their borrowed funds or supplement their own resources to buy an ox.

The Small Business Loan (SBL) is accessible on an individual basis and targets officially licensed and registered business activities. Loans under this category can be used to establish micro and small enterprise which include among others restaurants, tea stalls, grinding mills, wood and metal workshops, weaving, retail shops, etc. The Irrigated Agricultural Loan (IAL) is an individually accessible loan with the aim of motivating irrigated agriculture. Typical activities under this category include the financing of agricultural activities such as inputs for irrigation, horticultural faming, digging wells, livestock raising and fattening, buying forage for livestock, buying water pumps, etc. The Employee Loan (EL) is mainly restricted to government and private employees and intends to support employees in their efforts to improve their living standards.

Given the fungibility of credit among different uses, the use of the SMCP loan is not restricted to a particular sector of the economy. Provided that a loan is used for productive purpose and is feasible, a client is free to use it for any purpose that can generate income,

smoothen consumption, reduce vulnerability and make the borrower repay his/her loan. As clients of SMCP engage in diverse economic activities, the amount of loan disbursed, the term and maturity of the loan, and repayment mode is also different. Though lending bigger amounts would have been less costly and thus profitable, the SMCP decided to trade off this in order not to crowd out the poor whose borrowing capacity is limited due to their economic backgrounds. However, one factor that applies to all clients equally except for employee loan is the interest rate charged on loans. The SMCP charges 16 percent rate of interest on a declining balance for all its credit facilities except for employee loan which is 7 percent.

The 16 percent interest rate is actually higher than the rate charged by formal banks which ranges from 8-12 percent per annum. However, given the fact that the SMCP is mandated to serve remote and marginalized rural areas which involve higher operational and administrative costs than towns and urban centers, the rate charged by the SMCP seems to be rational though not sufficient enough for attaining a full cost recovery particularly with the increasing inflation rate in the country (Tesfamariam, 2004:78-79). Furthermore, the SMCP credit facilities are collateral free though co-signing is required at different levels. Mutual guarantee applies to all group based lending and full acknowledgement and co-signing by their spouse is required for individual based loans. The requirement of spouse co-signing during individual loan application is expected to empower women on the ownership and management of loan funds and diligently contribute towards its repayment in an otherwise male dominating society. The entry point for accessing loan is through the village/kebabi administration where the village administrator actively facilitates loan applications and shares the responsibility of on time loan repayments.

Repayment is made by installments at fixed time intervals. It appears in Table 2.7 that the maturity and repayment methods vary with the type of the loan product and the uses of the loan. The installment period for MBL, SBL, and EL is the shortest and that for agricultural activities are allowed relatively longer maturities. This indicates that the SMCP tries to offer its services in a way tailored to each particular context.

The SMCP has been applying mandatory deposits characterised by locked-in resources. Mandatory deposits are prerequisite for accessing loans and serves as a guarantee fund. The requirements for MBL, SSAL, and OL is to deposit 10 percent of the loan amount and ongoing mandatory deposit of a minimum 6 percent of their loan amount with each installment they make. For SBL and IAL loan products a deposit of 5 percent of the loan amount and ongoing deposit of 6 percent have to be deposited in each installment over the agreed loan term (Triodos Facet, 2007).

According to SMCP's annual report 2013, the institution is expanding its geographical presence in all parts of the country. It has branch offices in all administrative regions of the country. The geographical coverage of SMCP shows that while it has been able to cover sub-regional and kebabi (local) administrations with 96.6 and 77.3 percent respectively, its penetration down to the village level is only 47 percent. Starting from its inception in 1996 up to 2013, the SMCP has been able to open 604 village banks throughout the country. Given the overriding strategy of the SMCP to serve the rural population to improve their living standards with the village bank at its center, the formation and consolidation of the village bank remains a challenge.

Table 2.7: Number of SMCP clients by loan type, 2013

Type of loan	**No of Borrowers**	**No of Savers**	**Total**
Solidarity Group Loan	14748	13684	28432
Individual Loan	15514	6867	22381
Other	6166	-	6166
Total	36428	20551	56979

Source: SMCP 2014

As of 2013, the SMCP had 56,976 clients throughout the country of which 52 percent are female. Although the SMCP services are open to both female and male, the dominance of female is a common observation in most microfinance institutions. While in aggregate, solidarity group loan clients are higher (49.9 percent) than individual loan clients (39.3

percent) and 10.3 percent refer to others. Disaggregating the data in Table 2.7 shows that individual loan borrowers (69.3 percent) are greater than individual savers (30.7 percent) and group borrowers (51.9 percent) are greater than group savers (48.1 percent). Further comparison between 2010 and 2013 reveals that while the number of solidarity group loan borrowers declined by 24 percent, the number of beneficiaries of individual loan increased by 39 percent (SMCP, 2010 and 2014). The declining trend in the beneficiaries of group loan shows the convenience and preference of individual loan over group loan. The SMCP is not allowed by law to collect voluntary savings and therefore, the number of savers in Table 2.8 refers to mandatory deposits where clients are required to set aside a certain percentage of their loan as a guarantee fund.

The solidarity group loan includes mainly MBL and SSAL products whereas SBL, IAL and EL products are covered under individual loan. Table 2.8 shows loan allocation to the various credit facilities in 2013.

Table 2.8: Loan disbursement by loan product in 2013

Loan Product	**Loan Type**	**Amount in Nakfa**	**Percent**
Microbusiness loan (MBL)	Group	24,476,402.86	7.37
Small seasonal agricultural loan (SSAL)	Group	42,146,100.00	12.69
Irrigated agricultural loan (IAL)	Individual	137,329,000.00	41.34
Oxen loan (OL)	Individual	49,693,000.00	14.96
Small business loan (SBL)	Individual	72,910,000.00	21.95
Employee loan (EL)	Individual	5,661,442.00	1.70
Total		**332,215,944.86**	**100.00**

Source: SMCP (2014)
Note: Official exchange rate – 1USD = 15 Nakfa

As it appears in Table 2.8, agriculture related credit facility represents 69 percent of the SMCP's loan products though IAL dominates loan disbursement (41 percent) in 2013. SSAL, IAL, OL aim to improve agricultural productivity and the livelihood of the rural population. IAL and OL are accessed on an individual basis while SSAL is accessed through the establishment of solidarity groups. The SMCP endeavors to encourage group loan and follows a policy that at least 65 percent of the total loan amount should go to the group based

loans. However in spite of this fact, in 2013 the actual disbursement that went to group loan amounted to 66.6 million Nakfa which represent 20 percent of the total amount of loan. Compared to 2010, the amount of loan allocated to solidarity groups declined by 18 percent in 2013. This shows a big reversal favoring individual clients and signals to the management of the SMCP that they should adjust the share distribution between group and individual loan in the future in accordance to its stated policy.

2.6 CONCLUSION

Eritrea is a relatively young country that became independent in 1991 after a 30 year war for liberation. The socio-economic condition Eritrea found at liberation was extremely poor. The Eritrean economy is predominantly dependent on agriculture. The agricultural sector itself is characterised by its subsistence nature, relying on rainfall, and employing traditional modes of farming practices. Therefore, its contribution to GDP and employment and thus income is low. The performance of the manufacturing and trade as well as service sectors is also low owing to the structural rigidities and weak performance of the private sector.

The 30 years' war for independence and subsequent border conflict with Ethiopia as well as repeated drought has adversely affected the livelihood of the population and has been the main causes of poverty. The extent of poverty according to the 2003 estimates is relatively concentrated in rural areas. However, the efforts underway to expand social services particularly in the areas of health and education, the domestic and foreign investment in the mining sector as well as the efforts taking place to transform the agricultural sector is expected to reduce the overall poverty situation and put the economy in the direction of long-term sustainable economic development.

The financial sector in Eritrea is small, state controlled, underdeveloped, uncompetitive and provides basic and rudimentary services mainly to the urban centers. Credit is mainly directed by the state and the public sector remains the major beneficiary of the banking services. By all conventional standard indicators of financial sector development, the financial sector in Eritrea is still in infancy stage. The market share as measured by asset

possession and concentration index as measured by Herfindahl-Hirschman Index (HHI) proved that the market structure is highly concentrated and far from being competitive. The predominance of the money and quasi-money as a percent of GDP relative to the ratio of broad money to GDP proves that the financial sector mainly serves facilitating payments and transaction functions as opposed to saving and credit intermediation function which affects investment and economic growth. The findings on the monetary aggregates are further supported by the low level of domestic private sector credit to GDP ratio where the allocation of credit as a percent of GDP to the private and the allocation of credit as a percent of total loan to the different sectors (agriculture, manufacturing, trade and services) show that the sector lacks financial depth and is not performing the role it is supposed to play. The interest rate on deposits and loans is fixed and it did not adjust with the level of inflation which yields a negative real rate of return to savers and causes inefficiency in credit intermediation. Furthermore, the outreach of the formal financial institutions is limited in terms of the number of branches and its coverage of the rural areas.

The rural population hardly gets services of the formal financial institutions due to the inherent limitations of the financial institutions themselves, collateral requirement, and the general economic background of rural areas. The reluctance of formal financial institutions to extend credit to rural areas has also theoretical justification. The credit market failure observed in rural areas is a common phenomenon due to informational problems and associated transaction costs incurred by banks. Although conventionally collateral is required to reduce the problems of adverse selection and moral hazard, the economic conditions of the poor in the rural areas do not support the collateral requirement. The rural poor have neither the asset nor sustainable source of income to be used as collateral.

As a response to the limitations of the formal financial sector to provide appropriate and relevant financial services to the poor and marginalized population in towns and rural areas and fill the financing gap, the government established the SMCP in 1996. Since its inception, the SMCP has been extending microcredit and saving services with the objective of improving agricultural productivity, enhancing income generating opportunities and enabling households diversify their livelihoods. The SMCP has been able to extend its

outreach and penetration throughout the country. It has been able to sustain its presence down to the village level. It has 96.6 percent sub-regional coverage and 77.3 percent and 47 percent of local and village penetration respectively. Furthermore, it has a wide-range of loan products that suit the diversity of its clients. To what extent actually the SMCP positively affected the livelihood of its client's remains to be the central problem of this study and main motivation to undertake it.

CHAPTER 3
LITERATURE REVIEW

3.1 INTRODUCTION

This Chapter explores the various literature related to the relationship between financial sector development and economic development in general and the impact of access to micro-financial resources on household livelihood outcomes in particular. The chapter is divided into two sections namely: the theoretical literature review and the empirical literature review.

The theoretical literature section reviews the link between financial sector development, the provision of microfinance and economic development. It further explores the different pathways by which access to microfinance resources can impact household livelihood outcomes, such as consumption, saving, income, livelihood diversification, employment and enterprise promotion, risk and vulnerability, etc. In doing so, the section reviews the broader perspectives on the meaning and achievement of development objectives, the theoretical linkage between finance and development, the financial market imperfections observed in the developing countries, and the effect of microfinance both as a solution to financial market failures and an alternative source of finance to the poor.

The empirical literature part presents the various evidences on the empirical impact of microfinance on household livelihood outcomes. The section presents empirical evidence on the differential impact of micro-financial resources under various contextual, socio-economic and methodological grounds.

3.2 THEORETICAL LITERATURE

3.2.1 Review of the meaning and dimensions of development

Historically, development was conceived in terms of economic growth defined itself as a sustained increase in per capita income (Bellu, 2011). Surely, per capita income as a necessary condition has been proved to be a good candidate to measure the performance of a certain economic activity. However, development entails more than an increase in per capita income. For example, Todaro and Smith (2011:14-16) argue that development involves multi-dimensional processes requiring major alternations in socio-cultural, institutional as well as the acceleration of economic growth, the reduction of inequality, and eradication of poverty. Perspectives on the issue of development have been undergoing changes from the emphasis on growth-oriented development in the early 1960s, to the provision of basic needs of poor communities in the 1970s, to structural adjustment programmes and stabilization policies in the 1980s, to the ongoing efforts taking place to formulate a sustainable development approach amid increasing globalization (Otero, 1999).

There is general agreement that development thinking was triggered and greatly influenced by the industrial revolution in Europe and North America in the eighteenth century. The arguments in favour of industrialisation rests on the empirical observation that the manufacturing sector was responsible for an increase in productivity, capital accumulation, economies of scale, technological progress, backward and forward linkages as well as spillover effects (Szirmai, 2012:410). Sachs (1992) pointed out that underdeveloped countries were expected to move along the same track of those of industrialized nations to attain their development. Consequently, Hosseini (2012) observes that many underdeveloped countries find themselves having dualistic economic structures whereby the dichotomy between the modern vs. traditional or formal vs. informal sectors appears to persist and becomes significant leading to poverty and prolonged underdevelopment.

Since 2000, a shift in the development paradigm by major international agencies such as the UN, IMF, and World Bank have been observed such that international development goals

(such as the MDGs) have been associated with poverty reduction, greater access to health and education services, creation of employment opportunities, and protection of the environment. According to Bellu (2011), the achievemts of the MDGs would be instrumental to achieve wider development objectives that incorporate human, social, and environmental aspects. According to reports of the United Nations (UNDP, 1996; UNDP, 2010) more focus is being put on the dimensions of human development measured by life expectancy, improved access to all levels of education, health as well as people's living standard, which ultimately determine peoples' capability and their freedom of choice. In a broader sense the notion of human development incorporates all aspects of human well-being, from their health status to their economic and political freedom (Scheidel, 2010).

Economic growth**,** by increasing a nation's GDP has been perceived to reduce poverty and social problems with the assumption of a trickledown effect. However, there are instances where growth in a nation's total income has not led to equitable distribution of income and improvements in the quality of life (UNDP, 1996). To the contrary, higher economic growth was found to be achieved at the expense of unequal distribution of income, massive unemployment, and unwise consumption of natural resources endangering the prospect of the coming generations. For example, Dabla-Norris, Kochhar, Suphaphiphat, Ricka, and Tsounta, (2015) argue that a "growing income inequality reduces the potentials of economic growth to reduce poverty questioning the applicability of the trickle-down effect". As far as trickle-down effect is concerned, Reuveny and Thompson (2008) find that the upsurge in technology in the developed countries generated principal gains to the Northern economies and much less trickle-down effect to the developing countries.

Relatively recent in the development literature is the concept of sustainable development. It is a concept related with intergenerational equity claiming that development is sustainable if it "meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Report, 1987). Hopwood, Mellor, and O'Brien, (2005) relates sustainable development with environmental problems, socio-economic issues, poverty, and inequality and argue that in the presence of widespread poverty it is hardly possible to claim that an equitable and balanced development is taking place. Therefore,

viewed from such perspectives, development objectives and their achievement involve multidimensional processes and approaches extending from top-down to bottom-up channels of implementing policies (UNDP, 1996; Roy, 2003).

A classic bottom-up approach to development is offered by Nobel Laureate Amartya Sen. Historically inadequate income has been considered as a major factor for an impoverished life. Although low income is instrumentally significant as a cause of poverty, Sen (1999) contends that the primary objective of development is to maximise what he calls people's 'capabilities' – their freedom to 'lead the kind of lives they value, and have reason to value'. Stewart (2013) adds to the notion of capability approach to development, the role of social institutions and social competencies as determinant factors in enhancing individual capabilities.

3.2.2 The link between financial development and economic growth

There has been a continuous arguments and counter arguments regarding the link between financial sector development and economic growth. An extensive body of literature both at the theoretical and empirical level attests to this proposition (Patrick, 1996; Levine, 1997; Levine, 2004; Eschenbach, 2004; Ang, 2008; Hassan, Sanchez, and Yu, 2011). Questions related to causality such that whether financial sector development causes economic growth or economic growth generates a need for financial sector development has been a subject for empirical investigation. Earlier papers such as Schumpeter (1911) suggest that financial intermediation played a central role in improving productivity, accelerating technical change and economic growth through its effect on the allocation of savings to their best uses.

Hassan, Sanchez, and Yu (2011) in their studies on low and middle income countries found a positive relationship between financial development and economic growth. A study by Fung, (2009:56) proved the existence of conditional convergence between financial development and economic growth. Parallel growth was observed between the financial sector and per capita income in middle and high income countries mutually reinforcing to each other particularly in the early stages of economic development. In their studies on a sample of

thirteen transition economies, Garalova and Gaffeo (2014:89), found that there exists a positive long-run relationship between financial deepening and real growth and the potential becomes full when the funds are allocated to the private sector.

Earlier studies for example by Robinson (1952) cited in Levine (1997:688) found that finance does not cause growth, but rather, it responds to demands from the real sector economic activities. More recent studies by Greenwood, Sanchez, and Wang (2013: 2010-2011) using cross-country data found that, financial intermediation contributes to economic growth via facilitating technological progress. Similar conclusion was also reached by (Goldsmith, 1969; McKinnon 1973; and Shaw 1973).

Patrick (1966:175-176) labeled the link between financial development and economic growth as the supply-leading and demand-following hypotheses. The supply-leading hypothesis proposes that the direction of causality goes from financial development to economic growth, whereas on the demand side, the creation of financial institutions is a dynamic response to the demand driven by investors and savers in the real sector of the economy. With further growth in the economic and financial sectors, the supply-leading characteristics of the financial sector diminish gradually and are eventually replaced by demand-following characteristics. When explaining the process of financial system development, Patrick says:

> The evolutionary development of the financial system is a continuing consequence of the pervasive, sweeping process of economic development. The emerging financial system is shaped both by changes in objective opportunities i.e. the economic environment, the institutional framework and by changes in subjective responses--individual motivations, attitudes, tastes, preferences.

However, at initial stages of economic development, the supply-leading mechanism takes over demand-following as a means of triggering economic activities. This is a typically experience of developing countries, where the promotion of credit and other financial services is considered vital for fostering investment, whereas in a more developed economic environment, the financial sector mainly serves a complementary role for a more efficient performance of the real sector of the economy (Agbetsiafa, 2004:271). As far as studies on

the developing countries are concerned, Ang (2008:570) concluded that even though there is a positive impact of financial development on economic growth, structural and institutional differences among these countries may have differential impact on the relationship between finance and economic growth.

Berthemely and Varoudakis (1996) elaborate the linkage between finance and economic growth indicating that real sector growth fuels financial sector development which in turn the development of the financial sector through its mobilisation of savings and other specialised functions sustains capital accumulation and thus economic growth. This means that less developed financial institutions inhibit exchange and intermediation which then reduces the efficiency of investment. On the other hand, a matured economy with increasing growth rate could accommodate and support the growth and expansion of the financial sector. On the other hand, on the relationship between the size of the financial sector and productivity growth, Kharroubi and Cecchetti (2012) conclude that the size of the financial sector has an inverted U-shaped effect of productivity growth in that further enlargement of the financial sector beyond certain threshold reduces growth in the real sector.

Most economist agree that the vital role of the financial sector is that it enhances efficiency in the economy by reducing information, enforcement, and transaction costs and thus improving the productivity of investment. Financial institutions and markets offer a number of specialized functions to enhance efficiency in the conduct of economic activity. These specialized functions of the financial system include mobilising and pooling of savings, allocating capital, providing information, monitoring and exerting corporate governance as well as facilitating exchange, diversification and management of risks (King and Levine, 1993, Levine 1997, Levine, 2004, Stiglitz, 1998; Todaro and Smith, 2012).

The endogenous growth theory focuses on the importance of knowledge generation and innovation through research and development. In this regard, Thiel (2001) claims that the financial sector plays a supportive role by determining the cost of capital, and the incentive structures that affect innovative entrepreneurs.

The relationship between financial development and long-run growth was elaborated in the literature on endogenous growth (Laeven, Levine, and Michalopoulos, 2015). The endogenous growth theories postulate that long-run economic growth is determined by technological progress. Forces that govern the opportunities and incentives to create technological knowledge influence the rate of technological progress and thus the growth rate of total factor productivity (TFP) in an economy. Similarly Greenwood, Sanchez and Wang (2012) argue that a well-developed financial intermediation leads to higher TFP by allowing the allocation of funds to more efficient firms. While the neoclassical growth theorists assumed that technological progress is exogenously determined independent of internal economic forces, the endogenous growth theorists challenged this view by proposing channels on how internal economic forces affect the rate of technological progress. According to this theory, technological progress which determines long-run economic growth rates takes place in the form of innovations in new production methods, processes, and markets which in themselves are results of economic activities. These innovations are governed by policies and institutions that offer opportunities and incentives to create, disseminate and apply technical knowledge (Thiel, 2001).

The financial sector is one of those institutions that promote innovations in an economy. King and Levin (1993) following the Schumpeterian endogenous growth model argued that there are entrepreneurs who strive to earn a monopoly profit by inventing new production methods and processes to produce new and better goods. Comin and Nanda (2014) find that greater financial deepening contributes to a faster invention and diffusion of technology particularly for capital-intensive technologies by enabling innovative ideas to be experimented and commercialised. The financing of research and development (R&D) is also another channel by which the financial sector contributes to economic growth. Brown, Fazzari and Petersen (2009) present empirical evidence on the role of finance in R&D which is a major force in innovation in most endogenous growth models (See also Hall and Lerner, 2009).

Financial institutions by making resources available allow entrepreneurs to initiate innovative activities which enhance productivity improvement and thus stimulate economic growth.

King and Levine (1993) and Galetovic (1996) for example argue that the extent of financial sector development determines the frequency with which society allocates funds to those aspiring entrepreneurs with the highest probability of success in innovation. Hsu, Tian, and Xu (2014), in their studies on developed and emerging countries identified that in countries with better developed equity markets, high-tech intensive countries that depend on external finance were found to exhibit higher innovation.

Levine, Michalopoulos, and Laeven (2011), claim that there is a positive correlation between financial innovation and technological change. This leads into the argument that in the absence of financial innovation, technological change will eventually stagnate and growth will not take place. Therefore, financial innovations such as improvements in screening methodology increase the probability of identifying successful technological entrepreneurs eligible for funding. According to Eschenbach (2004), financial systems by evaluating entrepreneurs, pooling resources, diversifying risks, and valuing expected profits affect innovative activities initiated by entrepreneurs. The cumulative outcome is that, financial intermediation by enhancing efficiency in investment and offsetting the diminishing returns to capital contributes to sustained growth in per capita GDP.

As we move down from the general functional relationship to the realities in less developed countries, DFID (2004) outlines the role of the financial sector in less developed countries in stimulating pro-poor growth. Firstly, as part of their conventional function, financial systems serve in the mobilisation of savings important for productive investment and facilitate inflows of capital and remittances from abroad. These resources are critical in developing countries to speed up investment in physical and human capital which are important determinants of increased productivity. Secondly, the financial sector can bring about productivity gains through reduction in transaction costs, facilitating technology transfer, and improved use of resources. Thirdly, financial sector development by extending loans to be invested in income-generating activities and various enterprises can facilitate employment generation and increased levels of income. Finally, an improved financial sector can reduce vulnerability and minimise risk by providing mechanisms to absorb shocks that could

otherwise have adverse effects on long-term income prospects. A number of studies such as (Chemli, 2014; Odhiambo, 2009; Perez-Moreno, 2011) confirms the above proposition.

The roles and benefits of the financial sector in the developing countries have called for policy initiatives to strengthen the link and contribution of the financial sector to the real sector of the economy. McKinnon (1973) and Shaw (1973) in their seminal paper gave the theoretical foundations for the widespread adoption of financial sector liberalisation and reform measures in developing countries in the 1980s. They attributed financial repression in the form of interest rate ceiling, high reserve requirement, and other quantitative restrictions as the major causes for the low savings, credit rationing, low investment and thus poor growth rates. The solution for such restricted financial sector was to be found according McKinnon and Shaw on the policy of financial liberalisation. These policies can be summarized as 'freeing' financial markets from any intervention and letting the market determine the allocation of credit through the market mechanism. Interest rate deregulation, abolition of directed credit allocation, liberalizing entry into the banking sector, etc. constitutes instruments of liberalisation. According to the World Bank (1989), the liberalisation of the financial sector was part of the broader, sector-wide programmes of structural adjustment of the Bretton Woods institutions, which were intended to put developing countries onto a more stable and higher long-term growth path.

However, there is a general agreement that the results of the reform were disappointing, falling well short of expectations. Failure to recognise the underdeveloped and imperfect characteristics of financial markets in developing countries led policy makers and analysts to implement premature deregulation, with serious adverse consequences for the stability of the financial system as a whole (Brownbridge and Kirkpatrick 2000; Williamson and Mahar 1998:36-37). The immediate effects of the ensued financial problems was to slow economic growth and severely affect the most vulnerable section of the population with subsequent increase in levels of poverty in those countries hit by the crisis (World Bank, 2001). Odhiambo (2011) argues that studies on the effects of financial sector liberalisation on savings, financial deepening and economic growth are inconclusive. Moreover, understanding of government policies that preceded restricted financial policies was also

important to evaluate their implications. The adoption of various combinations of foreign fixed exchange rate regimes and external debts denominated in foreign currencies were actually the main reasons behind financial restriction in developing countries.

It was widely believed that improving access of the poor to financial services, including credit, savings and insurance against risk, could strengthens the productive assets of the poor and thereby enhances their productivity and potential for sustainable livelihoods (World Bank, 2001). Poverty can partly be associated with market failure and financial market imperfections particularly can limit access of the poor to formal finance because of the costs involved to extending small loans. Stiglitz (1998) indicates that the expansion of financial services to the poor can contribute directly to poverty reduction and livelihood improvement.

3.2.3 Financial market imperfections and microfinance

Policy-makers and researchers have been exploring ways to improve the operations of financial markets in underdeveloped countries most often with unsatisfactory results. The main reason for such an outcome is attributed to the failure of financial markets. Various theoretical and empirical literatures attempt to clarify how and why financial markets fail particularly in rural areas of developing countries. According to Besley (1994:29), a market failure is observed when a market results in an inefficient allocation of credit. Kunieda and Shibata (2015) argue that lack of information about borrowers, and under developed enforcement rules and institutions result in credit market imperfection and low quality of financial markets.

According Gine, Goldberg, and Yang (2012), under conditions of asymmetric information, lenders are unable to foresee the behaviour of borrowers and also limit borrowers' ability to fulfill their obligations. In the credit market, issues related to repayments affect the willingness of the lender to provide credit to a particular borrower where sufficient information about the borrower's willingness and ability to repay the loan is scarce. A borrower becomes unwilling to repay if he/she knows that the lender does have sufficient

means to enforce repayment. Moreover, a borrower could be unable to repay if he/she becomes a victim of covariant or idiosyncratic shock such drought.

Therefore, information about borrowers' condition including their risk attitude, efforts, credit histories and characteristics is critical to the lender in the absence of which credit provision becomes quite difficult if not impossible. The unwillingness of formal financial institutions to operate in rural areas of developing countries or target the poor shows the high cost of doing business in these areas mainly due to informational problems and leads to inefficient allocation of credit (Rao, 2012; Todaro and Smith, 2012). Monitoring costs due to insufficient information negatively affects banks willingness to extend credit. The higher the monitoring costs the smaller would be the credit extended and thus small investment and low economic growth follows.

Besley (1994:31) indicates that the credit markets in rural areas of developing countries are characterised by collateral scarcity, underdeveloped complementary institutions such as absence of appropriate record of credit histories of borrowers, and absence of insurance arrangements that reduces uncertainty borrowers' income and assets which all contributes to enforcement problems during non-repayment or default by borrowers. For example, in rural areas poor borrowers are unable to provide assets that could be used as collateral (Hermes and Lensink, 2007). In many rural areas land is not eligible for collateral because of poorly developed property rights and absence of land codification and registration.

Imperfect information is the primary cause of market failure and results in adverse selection and moral hazard. Adverse selection arises when lenders have insufficient information about the characteristics of borrowers and is usually observed before the transaction takes place (Besley, 1994:35; Mishkin, 2004:174; Hyytinen and Vaananen, 2006). In the financial market, the interest rate represents an income to the lender and a cost to the borrower. According to Stiglitz and Weiss (1981:393), the interest rate serves as a screening device to distinguish between bad and good risk borrowers. The interest rate has also an incentive effect in influencing the behaviour of borrowers expressed in the form of moral hazard.

The adverse selection aspect of interest rate is the by-product of different borrowers having different probabilities of repayment to their loans. The probability of repayment affects banks expected return and thus banks would like to extend their loans to borrowers who are more likely to repay. The willingness of borrowers to pay different rates in turn shows their repayment probability and level of risk (Stiglitz and Weiss, 1981:393). According to authors, borrowers who would agree to pay higher interest rate are considered to be more risky and their probability of repaying the loan is perceived to be low which would possibly lower the bank's profits. On the other hand, borrowers who are least risky and are most likely to repay their loan would be discouraged most and be excluded from borrowing if high interest rate is charged. Therefore, banks who decide to charge higher interest rate to offset losses from defaults will finally end up selecting borrowers with adverse behaviour. Besley (1994:35-36) and Stiglitz and Weiss (1981:407-408), argue that in a market failure with adverse selection particularly in rural areas of the developing countries calls for government intervention to expand credit through subsidies to improve welfare by minimizing the negative externality imposed by bad risk borrowers and encouraging and rewarding the good borrowers to borrow at an acceptable rate.

Moral hazard is observed after the transaction took place (Mishkin 2004:174). After the lending took place, there is no means to track whether the borrowers is using the loan in the stipulated project. This is also the outcome of information asymmetry that lenders are unable to discern borrowers' actions. The borrower after receiving the loan may engage in activities that are undesirable from the point of view of the lender and endangers the repayment of the loan. Therefore, According Mishkin "moral hazard lowers the probability that the loan will be repaid, lenders may decide that they would rather not make a loan". Like that of adverse selection, Stiglitz and Weiss argue that an increase in interest rate to offset moral hazard may increase the probability of borrowers selecting a project with high risk and engage in reckless behaviour that compromises repayment and profit of the lender and suggest credit rationing to include heterogeneous borrowers and government intervention to correct such externality and improve efficiency.

The arguments of imperfect information as a source of market failure seem to be more relevant for rural financial markets in developing countries. Besley (1994:40) argues that in rural areas information flows are concentrated over relatively close distances and within social groups. Individual characteristics tend to be easily identifiable making monitoring relatively easier and inexpensive. Such features make the availability of informal finance more prevalent in those areas. The fact that formal financial services are reluctant to operate at lower levels of income in rural areas means that the gap has to be filled with informal financial operators. The financial markets in developing countries are characterised by a dualistic financial structure of formal and informal financial institutions and markets (Chandavarkar, 1992:135). According to Ray (1998:538), the informal financial sector consists of money lenders, neighbors, relatives, friends, credit cooperatives, rotating savings and credit associations, landlords, millers, traders, and other agents who are using financial activities as a source of subsidiary income.

The informal money lenders have a comparative advantage in terms of access to information about the characteristics and activities of their clients as compared to formal financial institutions. According to Boucher and Guirkinger (2007), the informal lenders substitute the requirement for physical collateral with information-intensive screening and monitoring to extend loans to individuals excluded from the formal financial sector. Furthermore, informal money lenders accept collateral in different forms such as labour where formal financial institutions refused to do so. With regards to enforcing contracts, low social mobility of clients along with community networks most prevalent in rural areas can be used as a way of ensuring compliance with a loan contract. Social sanctions are also the main instruments to enforce loan contracts by spreading the credit worthiness of the client to the general public and other money lenders. In rural areas of the developing countries loan provision takes place along occupational lines such that landlords for example lend to tenants and farm workers, where the arrangement features a close relationship and the necessary monitoring mechanism to ensure enforcement for the lender (Ray, 1998:536-546).

Comparatively speaking, though informal money lenders have the advantage of micro level information about their clients, the amount of funds available is limited. Therefore, the

informal sector seems to be an imperfect substitute for formal financial lending. In such cases, microfinance either deliberately set up by the government or nongovernmental organisations is expected to fill the gap.

3.2.4 Microfinance as a solution to financial market failure

Information asymmetry in the credit market is reflected when the lender does not have sufficient information about the credibility of potential borrowers. In effect, the lender is unable to accurately estimate the probability of success and potential payoffs of a borrower's project. The lack of information on the part of the lender ultimately leads to credit rationing. Microfinance institutions following the Grameen Bank model have been trying to solve the problem of information asymmetry confronting to formal financial institutions by adopting the concept of group lending (Armendariz and Morduch, 2005; Hermes and Lensink, 2007; Kumar, 2012).

Group lending has become more popular in many developing countries since the 1970s. It is by far one of the most innovative solutions to provide access to credit for the poor in the developing countries. It has been used as a mechanism by which the problems of adverse selection and moral hazards are mitigated by reducing the cost information imperfections (Armendariz and Morduch, 2005:86; Stiglitz, 1990:359). Group lending involves peer screening and monitoring in that trustworthy borrowers are allowed to join the programme and ensure the fact that clients will invest the funds properly. The approach effectively shifts the responsibility from the lender to the client to overcome information and transaction cost problems typically observed in credit markets, especially for poor households without sufficient collateral. It was found to improve repayments rates although at excessive pressure on group members (Gine and Karlan, 2014; Kumar, 2012; Hermes and Lensink, 2007).

According to Devereux and Fishe (1993), the number of organized groups in Ghana, Malawi, India, Mexico, Nepal, the Philippines and Zimbabwe grew dramatically following the introduction of group lending. For example in Ghana the number of groups grew dramatically from 23 in 1969 to over 5000 in 1980. A frequent argument for the use of group

loan is that it lowers transaction cost of the lender. However, Devereux and Fishe (1993: 103), argue that the lower transaction cost must be weighed against the cost of organizing groups. They claimed that:

> The long-term viability of a group and likelihood of repayment however will depend more on the economic relationship between members of the group than the transactions cost-saving between the groups and the bank. In the simplest of terms, the transaction cost explanation is the supply side argument for making group loans, while the economic interrelationships between group members provides the demand side explanation for group formation and stability, which may be affected by the terms of the loan contract.

Devereux and Fishe (1993:105-110), found that success in group loan depends on five factors namely homogeneity among group members, social capital among group members, group size, joint liability and security fund. However, Chowdhury (2005: 429) argues that "social collateral" induced by group liability is not sufficient to ensure high repayment rates and therefore must be followed by sequential lending schemes where borrowers in a group do not access all the loans at once but sequentially.

Even though group liability lending has important merits, its shortcomings also call for attention. Some of its shortcomings as outlined by the World Bank (2008) includes the tension created among clients caused by group liability, the prevalence of "free riders", cost implication for clients with good risks, and divergence in preferences which appears as group members mature and demand for more resources for investment. Group liability lending triggers tension among clients when members of the group become overwhelmed to the activities of others in the group. Excessive tension harms the existence of social capital which is an important safety net in developing countries and results in voluntary dropouts from the group. Gine and Karlan (2010) and Savita (2007) also contend that group lending imposes additional costs in the form of group formation, higher frequency on installments, the need for higher supervision and penalises good credit risk customers.

Moreover, Armendariz and Morduch (2005:110-111) argue that the scale of lending and the possibility of collusion can threaten the repayment rate among borrowers. Monitoring cots grow as the scale of lending grows. This means that as the amount of loans increase the financial implication of default also rises. Therefore, up to a certain amount, preference for group lending dominates individual lending but beyond that critical point, individual lending will be preferred by clients. Kodongo and Kendi (2013) in their studies in Kenya conclude that as far as the risk of default is concerned group lending programme is more effective in mitigating the risk of non-repayment than individual lending programme.

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Empirical literature on the outcome of joint liability group lending show mixed results. Paxton, Graham, and Thraen (2000:648-649) use data of 140 groups from a group-based lending programme in Burkina Faso. They show that the homogeneity of the group in terms of their ethnicity, occupation, income, etc., reduces its repayment performance. Contrary to the findings by Devereux and Fishe (1993) the more members are homogeneous the less will be the incentives to screen, monitor and enforce each other. Furthermore, they found that training of members and good leadership were found to positively influence loan repayment.

Hermes, Lensink, and Mehrteab (2005:160) investigate the role of the group leader in reducing moral hazard behaviour, using data of 102 groups from two Eritrean group lending programmes. Their findings suggest that monitoring and social ties of the group leader with group members reduce moral hazard behaviour of members. Moreover, distance was found to be an important factor. The findings indicate that as the distance between the group leader and the other members' increases, the probability of occurrences to moral hazard also increases. The evidence shows that the role and efforts of the group leader is a determinant factor in improving repayment performance of the group.

Based on information from 146 groups in Madagascar on the role of social ties, Zeller (1998) find that, groups with stronger ties show higher repayment rates. This finding disproves the possibility of collusion among socially tied group members postulated by Armendariz and Morduch (2005). Moreover, Zeller concluded that it is not the level of physical and human assets of the group members but the degree of variance of risky assets among members that contributes to a better loan repayment.

3.2.5 Dynamic incentives: The repay-to-borrow principle

When group lending is followed with other incentives, it motivates borrowers to repay their loan. Such arrangements are called dynamic incentives. It involves rejecting applications to access future loans for those who did not comply as well as progressively increasing the amount of future loans for those who repay their loans regularly and on time. Dynamic incentives in the form of allowing future loans for borrowers who repaid their previous loans successfully and cut-off future loans otherwise, secures high repayment rates by overcoming information problems and improving efficiency (Bruno and Khachatryan, 2011; Kumar, 2012).

As Armendariz and Morduch (2005:123) and Morduch (1999:1582-1583) state, the justification is that microcredit programmes especially in villages start by lending just small amounts and thereby renewing clients application for another cycle of loan upon satisfactory repayment. This mechanism is effective for forward-looking borrowers whose need for further credit is binding and thus access to future loans is very important. The approach increases the cost of non-repayment and deters borrowers from defaulting strategically. As Armendariz and Morduch put it, "even without recourse to peer monitoring, collateral, or social sanctions, micro-lenders can give incentives to borrowers by threatening to exclude those defaulting from future access to loans". This shows that for patient borrower long-term gains from accessing future loan outweighs the short-term gain from default (Shapiro, 2015). Moreover progressive lending allows the lender to test the seriousness of the borrower, develop relationships through time and detect potential defaulters before the loan amount is scaled up (Ghosh and Ray 1997, cited in Morduch 1999:1583).

Installment payment on the part of borrowers is also another dynamic incentive to increase the rate of repayment. Most microfinance institutions insist that repayment of loans shall start soon after the initial disbursement and motivate their clients repay in small installments instead of requiring them to repay the full amount at the end of the term. The rationale of this mechanism is that regular repayment schedules alerts loan officers and group members to make note of the emerging problems of non-repayment and take appropriate measures to

address them. It also ensures repayment discipline among borrowers, screens out potential defaulters as early as possible (Armendariz and Morduch, 2005:129-131 and Morduch 1999: 1784-1585; Kumar, 2012). However, they further state that, though frequent repayments keep the likelihood of default low, since borrowers are required to start repayments before investment returns are due, it increases the transaction costs to borrowers thereby reducing the intended benefits to the client. This is because borrowers are necessarily required to look for additional source of income on which to draw to settle their debts.

3.2.6 Multidimensional pathways of microfinance impacts

The impact of microfinance at household level depends on the household's demand for financial services which is a function of household's initial resource endowment in terms of its physical, human, financial, and natural capital and other factors including the structure of markets affecting input and output prices, interest rates, socio-economic factors affecting income earning opportunities, government policies and institution as well as other related transaction costs. Thus, while access to financial services is basically determined by the microfinance institutions themselves, the choice to make use of the services available is left to the household (Zeller, Ahmed, Babu, Broca, Diagne, and Sharma, 1996)

The evaluation of microfinance impacts assumes that a borrower participates in income earning activities (such as agriculture, trade, microenterprises) for which their output growth is limited either by lack of capital or by the high marginal cost of credit. The provision of micro-financial resource is thus expected to relieve the capital constraint and permit the borrowers to increase output, profits, diversify livelihoods and hence their own welfare (Asiama, 2007; Boiwa and Bwisa 2014; Eshetu, 2014). Wanambisi and Bwisa (2013), state that microfinance contributes to the growth of private sector by supplying the financial needs of small and microenterprises. In a situation where internal financing is not sufficient, microfinance institutions by providing credit opportunities enable entrepreneurs to start and expand their enterprises. As Barnes (1996) argues that with improved access to financial services, households can effectively ensure the stability of income and consumption patterns as well as strengthen their resilience in times of shocks. When financial institutions provide

households with adequate financial resources at the right time and with appropriate terms and conditions, they can provide households with opportunities to diversify their economic activities.

There are a number of pathways by which participation in microfinance services could affect household livelihood activities by way of increasing their income sources, reducing their vulnerability and risk, strengthening their asset base and diversifying their livelihood strategies.

3.2.6.1 Risk-coping and livelihood diversification

Risk is inherent in human life. Sebstad and Cohen (2000) define risk or shock as the chance of loss or a loss itself. Risk is defined as a "probability or threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through pre-emptive action" (Business Dictionary, 2015). Risk has a variety of forms and sources. It may be caused by variables related to seasonality, or fluctuations in weather, inflation, negative events such as sickness or death of a family member, loss of employment, natural disaster, war, etc. Risk can also be associated with life cycle events such as the cost of marriage, education, etc. The ability of the household to deal with different shocks and economic stress depends on the resource endowment (Sebstad and Cohen, 2000).

Households particularly in rural areas attempt to reduce their exposure to risks and shocks by combining different strategies and diversification of economic activities. Barrett, Reardon, and Webb (2001) observe multiple motives prompt households and individuals to diversify assets, incomes, and activities. These motives are triggered by 'push' and 'pull' factors. The push factors show the response of households to risks due to a decrease in factor returns. The objective of diversification driven by push factors is mainly to stabilise income and consumption flows. The pull factors are carried out to make advantage of strategic complementarities between activities, such as crop-livestock integration, specialization according to comparative advantage based on skills, endowments and technologies the

objective of which is to create opportunities for income diversification in production and expenditure-linkage activities.

Barrett, Reardon and Webb (2001) further state that in the absence of a well-developed asset markets (labour, financial, land) whereby households can exchange their assets and make use of opportunities to achieve the optimal mix of income sources, diversification becomes the natural response. In a study conducted in Zambia, Kalinda (2014) finds that households exercise crop diversification and substitution, livelihood diversification, selling of livestock as a means of reducing and mitigating shocks.

The demand for micro-financial resources in rural areas can be seen in the context of an attempt to reduce their exposure to risk, improve their flexibility and mobility as well as diversify their livelihood activities (Eshetu, 2014). As the extent and degree of shocks and economic downturns differ, their consequences in terms of loss are also different. According to Sebstad and Cohen (2000), households respond to the consequences of loss differently. Some of them may be forced to draw down their resource base and aggravate their long-term vulnerability. Example includes sell of an asset that comprises the household's capability to generate future income. On the other hand, for the better off households who command more options, the response could be through reducing consumption, mobilising labour, searching for new source of income, using up previous savings, etc. These strategies do not potentially diminish the long-term security of the household.

3.2.6.2 Income generation and consumption-smoothing

The conventional belief is that loans can provide additional financial resources used to enhance household's initial endowments so as to generate more income. Credit allocation to a particular use is determined by the level of opportunity costs involved in consumption, production, and investment activities. Improved access to credit reduces the cost of productivity-enhancing technologies in the farm and non-farm production activities. For example, access to credit can allow farmers to increase the use of productivity-enhancing methods such as improved seeds and fertilizer and produce more crops per unit of land and labour (Feder, Just, and Zilberman, 1985 cited in Sharma and Zeller, 2000). Similarly Khan

(2014), in his study in Pakistan finds that microfinance has positive impact on household income and consumption levels.

The prime objective of the poor is to avoid the reduction of food and non-food consumption as well as income flows below a minimum threshold. According to Morduch (1995), the priority of any household is to make sure that income flows are uninterrupted. This can be achieved by applying conservative production methods and diversifying economic activities. Households with steady flow of income stream that satisfies its demand for cash flows choose less negative coping mechanism for the purpose of smoothing consumption. Steady flow of income presupposes diversifying sources of income to protect the poor against shocks and adverse economic events.

The neoclassical economic theory assumes that the financial sector permits an intertemporal resource transfer in which individual agents would be able to forgo present consumption so that capital accumulation will be possible through investment and enables resource allocation overtime. The Keynesian economic theory also focuses on the macroeconomic role of finance and postulates that the financial sector allows the financing of long-term and productive investment projects (Winkler, 1998). At the household level, Mago (2014) argues that improved access to financial services relaxes shortage of capital thereby improving productivity and thus household income with a positive multiplier effect on consumption, investment and asset accumulation and thus contributes to economic development. This is the conventional argument for the provision of resources by micro-finance institutions. Investment and asset accumulation can effectively reduce the variability of consumption and income over time. However, in a poorly functioning credit market, where credit constraint is binding, poor households are unable to shield their consumption in the face of income shortfalls. In a study in Peru, Jacoby (1994) cited in Zeller (1999) found that during adverse income shocks, household without access to credit were forced their children from school so as to help them participate in income generating activities which amounts to substituting present consumption over future consumption.

Within the context of consumption and income, access to microfinance can have a positive effect on food consumption and thus contributing to household food security. Zeller (1995) observes that households respond to food shortages by selling assets, calling in gifts from friends and relatives, and searching for ways to obtain credit from formal and informal sources. With access to credit therefore, households will have the opportunity to stabilise consumption, protect against forced selling of assets, and strengthen their potential for long-term risk management.

As far as the food security of the poor is concerned, according to Heidhues and Schrieder (1995), the absence of rural financial services has two main consequences. Firstly, lack of access to financial resources to bridge temporary, often seasonal short-term food shortages, can cause loss of human productive capacity because of malnourishment and undernourishment. Lower productive capacity which could be translated into loss of future incomes can lead into chronic food insecurity with serious long-run effects. Secondly, lower income and lack of access to financial resources can undermine the ability of rural households to invest in agriculture which may further jeopardise long-term food security. Access to affordable and appropriate rural financial market services can, therefore, improve food security through consumption and production effects of micro-financial resources. The work of Islam, Maitra, Pakrashi, and Smyth (2015) concludes that microcredit programme participants were found to have improved calorie, reduced incidence of food poverty, and lower incidence of stunting among children under the age of five supporting the contribution of microcredit to food security.

3.2.6.3 Financial intermediation and saving mobilisation

Historically by the standard of formal financial institutions, the rural poor either cannot save or save very small amount, therefore cannot respond to the incentives or opportunities offered by financial institutions. This led to the conclusion that collecting savings in small accounts would be unprofitable given their huge transaction costs. As a result the microcredit institutions were exclusively focusing on the provision of credit. Vogel (1984) describes the neglect of the saving component as ‘the forgotten half’ of the financial intermediation.

The long standing point of view has come to an end with the transformation of microcredit to microfinance to incorporate not only credit but also saving and insurance services. The transformation proved the fact that low-income households can positively respond to a wider availability of financial services. The argument is based on ample empirical evidence that shows that there exists high demand for financial savings, and that saving is more crucial for microfinance clients than credit (Robinson, 2001). Studies on the Financial Diaries of the poor in India, Bangladesh, and South Africa, MicroSave studies in eastern and western Africa, as well research by the International Food Policy Research Institute, have documented that the poor does indeed save (African Union, 2009). For example, the findings by Masumbuko, Kerongo, and Wafula, (2014) reveal that microfinance enhances financial intermediation in the form of improved resource allocation, reduced transaction cost, and improved saving culture.

According Zeller and Sharma (2000), savings by households represent the largest component of domestic savings particularly in low-income countries. The evidence suggests that savings by the poor involves both monetary and non-monetary forms including in the form of human capital. The nature to which saving is kept is determined by the availability of appropriate institutional saving facilities. At the household level, the lack of appropriate institutional saving facilities forces the household to depend upon in-kind forms of saving which include jewelry, livestock, and other durable assets. A more pronounced form of monetary saving in rural areas is the Rotating and Credit Associations (ROSCAs). Although ROSCAs services are restricted in terms of liquidity, rate of return and convenience, they represent an informal saving alternative to the poor.

Why do the poor save? Poor households save for many reasons. Zeller and Sharma (2000) argue that saving facilitates the accumulation of capital over time which boosts income and consumption in the future. The need for saving can be attributed to two main motives. The first motive is the need for accumulation or to take advantage of investment opportunities, and the second one relates to precautionary saving that helps cope with emergencies (Ledgerwood, 2013). In this motive households save to meet unforeseen or unexpected

contingencies. Its objective is to maintain a minimum level of consumption for the future. Adverse income shortfalls and unexpected increase in expenditure due to factors such as inflation, events that require lump-sum expenditure such as wedding are typical examples of the need for precautionary saving. Saving facilities also help household keep their lump sum resources in a secure place (CGAP, 2005).

The inter-temporal model which depends on life-cycle income hypothesis indicates that individuals borrow when very young, save when they are in middle age, and dissave when they get older. The model predicts that consumption is likely to be relatively stable over the life cycle and does not depend on cyclical fluctuations of current income (Ando and Modigliani, 1963). Saving models that depend on life-cycle hypotheses are dictated by long-term accumulation. However, households can also save to finance short-term investments and to smooth consumption fluctuations. This type of saving model is based on permanent-income hypothesis developed by Milton Friedman in the 1950s (Friedman, 1957). Therefore, in times of economic slowdown households will either withdraw past savings or borrow in order to maintain relatively stable consumption levels over time. Similarly in times of economic upswings, they tend to save the extra income above a certain threshold.

The amount households actually save and consume depends on their time preference and the level of interest rate which measures the opportunity cost of consumption. In an intertemporal setting, if households' time preference is greater than the market interest rate, they become impatient to save and thus consumption today becomes higher than consumption in the future. However, as put by Ledgerwood (2013), poor people put priority on convenience, access, security and proximity over interest rate earnings.

3.2.6.3.1 Forms and determinants of saving in rural areas

In the previous section, we have seen that poor household in rural areas save for a variety of reasons. Some of them save to smooth income and consumption flows. Robinson (2001) argues that farmers save to dampen seasonal fluctuations in output, entrepreneurs save for the purpose of business expansion. Mas (2009) argues, when comparing saving and credit,

households prefer to save than to borrow, because savings are relatively cheaper and are fully under the control of the household.

For many microfinance institutions involuntary or forced savings constitute a precondition to access credit. Savers are required to prove themselves that they are financially disciplined with convincing saving records to qualify for loan. There are many instances where microcredit programmes have used involuntary savings as part of their innovative approach by way of withholding part of the loan allocated to the client. The benefit of forced saving is that it serves as a collateral substitute in that small and regular payments will gradually contribute to higher repayment performance. Its disadvantage is that it restricts the opportunities to withdraw and utilise at any time at the client's discretion (Armendariz and Morduch, 2005; Bruno, and Khachatryan, 2011). Therefore, when households put aside certain amount of the loan in order to access credit, in effect it means that part of the loan becomes unproductive. It has further argued that microfinance institutions may evaluate the financial discipline of the client by looking at her/his saving records and serves them as a criterion for selection their clients.

According to Adams (1978), in spite of some limited success, forced savings programmes appear to be severely restricted in their ability to mobilise large amounts of rural financial resources. In part this is due to the fact that most farmers view forced saving programmes negatively. Farmers see forced deposits as additional costs for securing loans or other services provided by microfinance institutions. This is due to the negative or very low rates of return which savers realise on their deposits.

Voluntary saving on the other hand represents integral components of financial intermediation. Economic theory tells us that disposable income is either consumed or saved. The availability of saving instruments enables clients to convert non-interest bearing cash to interest-earning savings. As Barnes (1996) indicates, access to voluntary saving instruments ensures safety, increases the absolute amount saved, and allow households to undertake large sum of expenditures that otherwise could not be possible. Therefore, the provision of financial services on a sustainable basis could be an important strategy for poor people to

convert small amounts of savings into large lump sums to protect themselves against shocks as well as take advantage of investment and business opportunities.

According to (Fiebig, Hannig, and Wisniwski, 1999; Robinson, 2001; Armendáriz and Morduch, 2005, Ledgerwood, 2013), savers choose to hold a range of assets that presents various forms of savings: real assets in different forms, cash or deposits in formal, semi-formal and informal institutional arrangements. The composition and type of portfolio in which savers wish to store their excess liquidity depend among others on transaction costs, ease of liquidity, rate of return, divisibility of savings, safety, confidence of savers, financial reciprocity, etc.

Johnson and Rogaly (1997) assert that deposits at financial institutions have substantial benefits over in-kind saving or keeping cash at home. The choice of savers for deposit accounts reflects their preferences for security, accessibility, liquidity, divisibility, and rate of return. Available empirical evidences show that depositors react positively to an increase in the rate of return by comparing both expected interest income and transaction costs (Robinson, 2001). However, there is the case that the poor can save even if the rate of return is low indicating their emphasis on other factors such as safety and accessibility and particularly proximity (Ledgerwood, 2013). Furthermore, deposits give savers more control over their resources as they know when and how they can withdraw their deposits and predict what interest income they can expect in advance.

In-kind saving such as grain or livestock on the other hand can easily deteriorate and lose value over time. When it comes to divisibility, in-kind savings are often not divisible, i.e., cannot be liquidated in appropriate units to fit smaller liquidity demands. Cash is the most liquid and convenient of all assets. In a monetised economy, it is perceived to be important to keep some cash in the house for the purpose of emergencies and make use of unexpected business and investment opportunities. However, savings in the form cash at home are also liable to the risks of theft, fire, flood, lose its value during inflation, and liable to unintended expenditure.

As far as the gender dimension of saving is concerned, Fiebig, *et al*.(1999) reported that "research on women in finance demonstrates that saving facilities and instruments are probably the most important financial services that can be offered to women On the one hand, experience indicates that female clients of financial institutions show more thriftiness and are often more disciplined than men are in making regular savings".

3.2.6.4 Enterprise promotion and employment creation

Microenterprises play an important role as a source of income and employment. In most developing countries, micro and small enterprises employ large proportion of the workforce. Microenterprises have been gaining importance as an engine of growth and poverty alleviation tool in the developing countries (Liedholm and Mead, 1998; De Mel, Meckenzie, and Woodruff, 2008).

The contribution of microenterprises to household income may vary from rural to urban contexts. In a rural context, microenterprises typically supplement seasonal agricultural income, link the agricultural household to the local market, and provide employment opportunities for those not directly involved in agricultural activities. As a source of employment, the microenterprise sector is more reliable than farming in some ways due to its ease of entry and low start-up capital requirements. In urban areas, by contrast, microenterprises may play a more critical role in household economic security due to limited employment options in the formal sector of the economy (Sebstad, Neill, Barnes, and Chen, 1995).

The extent to which microenterprises contribute to increasing income and employment and thus to economic growth depends on the general performance of the economy and the extent to which microenterprises are linked to the formal sectors of the economy. There are 'demand pull' and 'supply push' arguments to the contribution of microenterprises to the overall economic activity. With regard to 'demand pull' scenarios, some papers argue that microenterprises and the informal sector in general can have the potential to increasingly evolve and penetrate to wider markets. This increases the overall level of economic activity,

and can lead to more efficient allocation of resources, and to increased income and welfare for the owners of microenterprises. In this case, microenterprises are considered as part of a dynamic economic growth process (Liedholm and Mead, 1998:66-68). A section of the literature also claims that, microenterprises and the informal sector are merely the result of poor economic performance. Although they may generate economic benefits in the short-run, the basic reason for their existence is due to excess supply of labour, and serves as a survival strategy for poor people. In this "supply push" scenario, microenterprises are a source of income and employment for surplus labour, but are not linked to dynamic growth sectors of the economy (Sebstad, *et a*l., 1995).

The job creation potential of microenterprises has been a subject of debate. Some evidences show that microenterprises have the potential to generate employment through the relatively easy entry to start and expand business. Others argue that their employment creation is negligible because of high contraction and closure. Liedholm and Mead (1998:62) in their survey find that microenterprises provide employment to 17-27 percent of the population of working age. The findings suggest that most activities are categorised as very small consisting of self-employed. The major contribution of these enterprises to employment is mostly in the form self-employment. Working proprietors represent more than half of the work force created by micro and small enterprises. Unpaid family labour also constitute substantial amount to microenterprise activities. From this survey it is evident that the use of family labour is a typical characteristic of most microenterprises in the developing countries.

Daniels (1999:55) in his study on five Sub-Saharan African countries estimated that while the micro and small enterprises sector offers employment on average to 22 percent of the work force, the formal sector provides employment to only 15 percent of the adult working age. In a study conducted in Kenya in 1994, Daniels (1999:59-60) found that micro and small enterprises significantly contribute to job creation and national income in Kenya. It contributes employment to more than one-third of all working age and accounts to 13 percent of GDP of the country. He further added that even though their individual contribution may be small, their overall contributions to the national economy cannot be ignored. The study

also reported that for some households' micro and small enterprises represent the sole source of income.

It has been well documented that access to financial resources is an integral component of economic development. Financial institutions offer the opportunity of accessing capital to small firms that have the potential to grow. However, in the developing countries, lack of access to credit is claimed to be the major constraint deterring the growth of small businesses and talented entrepreneurs. According to Somolekae (1996) and Fox (2012) microenterprise owners report that their topmost constraint on the start-up and expansion stage is the difficulty in obtaining credit services. Lack of collateral is the primary reason for not borrowing from banks. In his survey in Nigeria Owualah (1990:423), found that 61 percent consider lack of collateral security to be responsible for their inability to secure bank credit. According to Kuzilwa (2005:134) only less than 5 percent of households in the urban and rural areas in Tanzania had access to credit from formal sources; less than 2 percent of low-income entrepreneurs have access to financial services.

Although credit is a critical financial resource for the growth of microenterprises, the claim that it is the single problem faced by micro entrepreneurs and thus access to credit will help poor people to successful enterprises is over-estimated. Kuzilwa (2005:134) observes that it is not only finance but also the overall dynamics in the entrepreneurial processes and available economic opportunities determines their success. He further argues that "finance along with other institutional factors enhances the ability of the entrepreneurs to take advantage of these opportunities, thereby leading to entrepreneurial success. Lack of it could lead to business failure".

3.2.7 Microfinance and livelihood development

The provision of financial resources is not an end in itself. It is a means to achieve a specific objective such as livelihood development. Microfinance enables households to mobilise and harness their resources and optimally exploit the opportunities available to them. Private and local resources are the foundation for household and community development. It is believed

that resources at the disposal of households are the basis for their livelihood development. Microfinance brings a positive change in household livelihoods through its production and consumption effects as well as its social effects in empowering women and promoting the culture of entrepreneurship (FAO, 2000; Ziaul, 2014).

Access to small financial resources encourages the expansion of existing or setting up new non-farm microenterprises by mobilising and putting up together the resources owned by the household. Microfinance also improves agricultural productivity by adopting productivity enhancing methods and inputs thus increasing yields per hectare. Therefore, financial resources used for investment purposes increase production and income for the household and positively contributing to the local economy. According to FAO (2000), an increase in income in turn, will have a multiplied effect on the quantity, composition, and timing of consumption, saving, and asset holding. The acquisition of new assets and improvement and consolidation of the existing ones along with increased income ensures consumption stability, food security and strengthens economic security. Through its effect on household livelihood and local economic development, microfinance can also have positive repercussion effects on natural resources. By relaxing the dependence and pressure of the rural poor on natural resources and promoting diversification of alternative economic activities, microfinance can have beneficial impacts on environmental sustainability.

The linkages between microfinance and household resources on the one hand and their production and consumption activities on the other hand are best explained using the Household Economic Portfolio Model (HEPM) and Sustainable Livelihood Approach (SLA). The HEPM explains the interaction among resources, economic activities and the circular between them. The ability of the household to pursue different livelihood strategies is dependent on their resources endowments (Scoones, 1998). Economic activities include consumption, production and investment activities with returns in the form of satisfaction, income and asset accumulation respectively.

Microcredit is one component of the microfinance services. According to Dunn (1996), loans from microfinance institutions provide an additional financial resource in the current period

to be allocated to any or all of the household's activities. The proportion of household loan that is actually allocated to various activities depends on several factors, including available economic opportunities, economic and social constraints, joint and individual preferences, as well as intra-household decision making dynamics (AIMS, 2001).

The main advantage of the HEPM in assessing the impact of microfinance is that it incorporates the issue of fungibility of microcredit in the sense that credit may be used for a variety of purposes within the household activities. If the loan is used for production or investment activities, it may increase the size of the resource flow back into the household. This increased resource flow can both augment the resource base available to support activities in future periods and enhance the household's repayment capacity. If the loan were allocated to consumption activities, it would divert resources off the production and investment activities and thwarts the repayment capacity of the household as resources are leaked from the circular flow. Therefore, it is not realistic to implicitly assume that loans taken by a household will be used for a single activity (Al-Mamun, Adaikalam, Mazumder, and Wahab, 2011).

The livelihood approach stresses the significance of assets or capitals and their contribution of household livelihood outcomes. DFID (1999) distinguishes five capitals or assets: physical, human, financial, natural and social owned and used in a variety of combinations to achieve livelihood outcomes. Household assets represent the stock of resources on which they can depend to generate income, meet their basic needs, manage risk, and cope with stresses and shocks. A larger stock of assets generally means a greater livelihood opportunities and greater livelihood and economic security.

The term livelihood is often used interchangeably with strengthening economic empowerment and refers generally to economic production, employment, and household income. A more holistic understanding of livelihood, however, incorporates a broader context of economic development, reduced vulnerability, and environmental sustainability. It could be for this reason that the livelihood approach is also called the Sustainable Livelihood Approach. A hallmark of the livelihood approach is its emphasis on the capabilities and

assets of the rural poor, based on the recognition that they hold wealth in at least some household assets.

The value added by a sustainable livelihoods approach to microfinance is its focus on households' capabilities, assets and vulnerability, and how rural micro financing can play a part in enhancing people's livelihood strategies and outcomes. It offers the opportunity to examine the role that targeted microfinance services can play in raising rural households' resource endowments and capitals in a sustainable and meaningful way.

Formal financial institutions tend to be reluctant to extend financial resources to the poor and vulnerable rural household, primarily engaged in smallholder farming. Some of the reasons include, dispersed demand for financial sector, low economic activity, high information and transaction costs, weak institutional capacity, seasonality of agricultural activity, and lack of usable collateral. For these reasons, targeting them is usually considered too costly and carries high risks in the form of default and non-repayment. Nevertheless, history and experience proved that the rural poor households constitute a substantial part of microfinance institutions' potential client base in the developing countries (Besley, 1994; CGAP, 2003; Rabobank, 2005). Hence, adopting a sustainable livelihoods approach can contribute to the understanding of microfinance institutions on the specific needs and priorities of potential clients who are otherwise not considered bankable by main stream financial institutions. Such understanding is not only central to the analysis of impact but also crucial for microfinance institutions to develop appropriate microfinance products and lending strategies that respond to small farmers' real needs and capacities (Mago, 2014).

The causal relationship between microfinance and its benefits to the rural household could be explained by way of its effect on investment on household assets, consumption-smoothing, promotion of income generating activities in rural areas. As Gulli, (1998) outlines, microfinance provides additional purchasing power, permitting households and individuals to exceed the limitations of their current economic situations. For instance, access to financial resources provides a means to accelerate accumulation of assets. The accumulation of physical and human assets in turn augments households' capabilities to improve their living

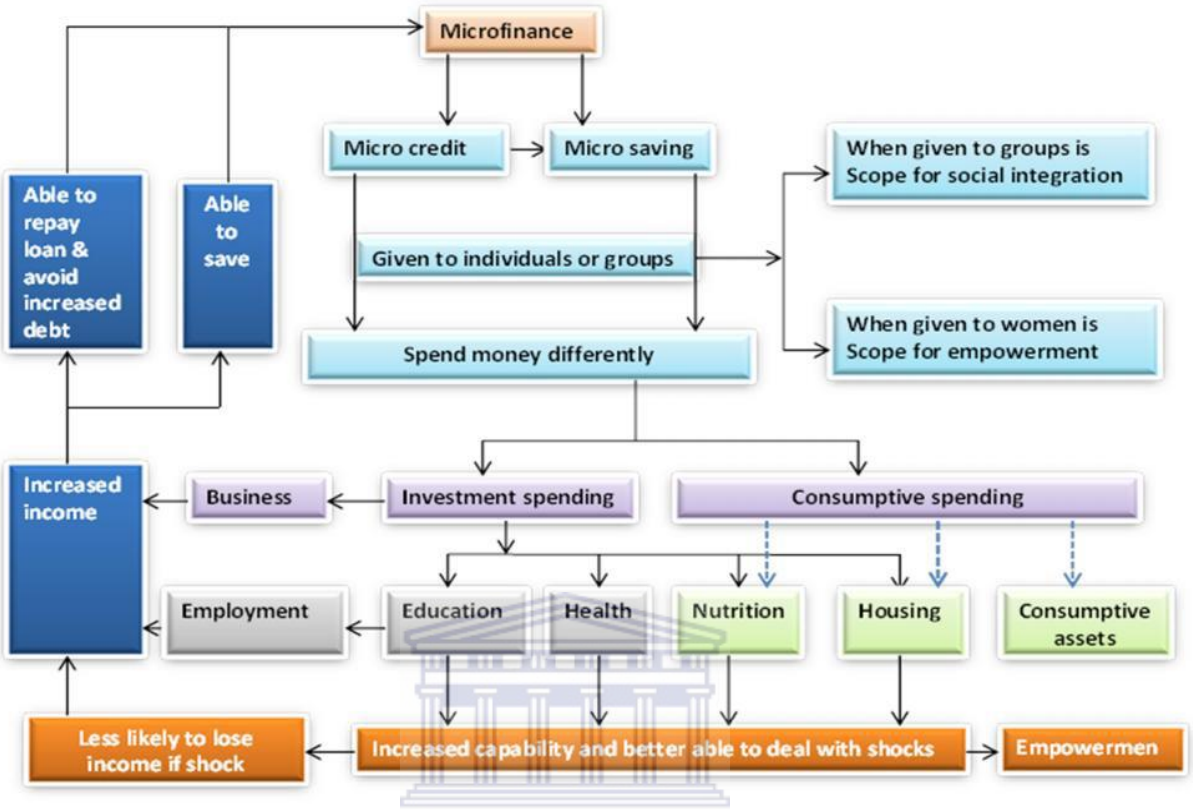
standard by enhancing their long term productive potential. Access to financial resources enables poor people to manage their natural resources in a more sustainable and efficient manner. For instance, they can reduce working capital constraints if financing allows them to purchase inputs for their microenterprises which play an active role in the households' income earning capacity and contribute to the gradual development of a viable private sector that could play a leading role in the transformation of the economy. Furthermore, Mago (2014), argues that the availability of assets determine the livelihood strategies that people in rural areas need to adopt and the availability of financial intermediation in the form of microfinance supports the building up and accumulation of assets.

> "Microfinance enables rural households to have control over their assets and environment. As a result they become capable of defending themselves against impoverishment as they engage in coping strategies for their livelihoods. Access to finance makes them to engage in risky but potentially profitable economic activities that are likely to make them wealthy. The poor are thereby empowered to pull themselves out of poverty and the vicious cycle of poverty transforms to a virtuous cycle of positive livelihoods outcomes" (Mago, 2014:558).

Accesses to financial resources also reduce households' vulnerability by providing means to cope with emergency needs during seasonal changes and market fluctuations. It also helps to prevent households from selling their productive assets in times of low cash flows thereby increasing the economic security of the household without compromising their asset base in the long-run. Furthermore, the household can improve its social capital through its participation in solidarity group loans, and establish mutual trust and reciprocity. In addition, household members may experience a rise in self-esteem, dignity and a sense of empowerment through opportunities provided by access to financial services. Therefore, the provision of micro financial resources can directly or indirectly contribute to strengthening of the livelihood assets and activities which constitute a center stage in the livelihood approach.

In conclusion Stewart, Rooyen, Majoro, and de Wet (2010) present the multidimensional channels of microfinance impact and their linkages in the following schematic model.

Figure 3.1: Microfinance impact pathways



Source: Adapted from Stewart, et *al*., (2010)

As displayed in Figure 3.1, microfinance intervention both in the form of microcredit and microsavings can be given either to individuals or groups. Clients spend their financial resources differently signifying the fungibility of microcredit. When given to groups and women, it is expected to strengthen social cohesion and women empowerment respectively. Clients use their money either by investing in the future such as the acquisition of productive assets, business investment and investing in human capital formation in the form of educating their children. They may also spend it for consumption purposes that would enhance their scope for productivity and household durables that retain value. Consumptive spending can also include nutrition, housing, etc. These investments have significant impact on clients' capabilities, their scope to deal with shocks and their ability to earn income. The accumulation of productive and business assets, the improvement in human capital through training, education, and nutrition, the protection against risks and shocks as well as the creation of employment opportunities contribute to increased income which will ultimately

leads into more consumption (welfare) and more savings. Moreover, increased level of income will enable clients to successfully repay their loans and eventually diversify their livelihood strategies.

3.3 REVIEW OF EMPIRICAL LITERATURE

The previous section attempts to explore the theoretical perspectives starting from the link of financial sector and economic development at the macro level down to the channels of microfinance impact on the livelihood of the targeted population at the micro level.

The major issue surrounding the study of any impact assessment is the use of an appropriate methodology that could capture the relevant variables responsible for the impact. In impact assessment the need to create cause and effect relationships to the actual intervention variable requires knowledge of the beneficiaries' sources and uses of funds as well as establishing an appropriate counterfactual indicating what would have happened if the loan had not been made. In response to these challenges researchers have been developing various methodological approaches to overcome such problems (Odell, 2010). Two broad methodological approaches are available to impact assessment studies. These are experimental approach and nonexperimental or quasi-experimental approach.

The experimental approach involves the random assignment of participants into the treatment and comparison groups. Randomised Control Trial (RCT) is a typical example of this approach. When done properly, randomisation creates a comparison group that comprises of participants with identical distribution of observable and unobservable characteristics to those in the treatment group. Therefore, random assignment is expected to overcome the problem of selection bias inherent in impact assessments. Another approach is nonexperimental or quasi-experimental approach where comparison participants are constructed using matching or reflexive comparisons. Two broad categories under nonexperimental approach are the before-after and cross-section designs. The before-after method involves the comparison of outcomes of groups of individuals after their participation in a programme with outcomes of the same groups before participation. An example of

before-after estimation is the Difference-in-Difference approach which depends on comparison of outcomes for participants and nonparticipants before and after the intervention for the same group. This approach requires baseline data. When randomisation is not feasible and baseline data are not available, Propensity Score Matching (PSM) method which uses cross-sectional data becomes appropriate alternative to assess the impact of an intervention. According to this method, selection is purely dependent on observed characteristics (World Bank, 2011; Khandker, Koolwal, and Samad, 2010).

The objective of this survey of empirical literature is to review the evidence available on the impact of microfinance carried out using experimental and nonexperimental approaches.

3.3.1 Impact evidence using experimental approach

Among those frequently referred experimental impact assessment studies is the one conducted by Banerjee, Dulfo, Glennerster, and Kinaan (2009) in Hyderabad-India. They applied randomised evaluation methodology. The study reports that, 15 to 18 months after the introduction of the programme, significant increase on the purchase of durable goods related to enterprises and significant decrease in expenditures on temptation goods was observed. However, no impact on consumption and human development outcomes were documented. An increase in spending on durable goods used in business activities suggests that access to microcredit substantially increased investment expenditure on business activities.

As far as spending on temptation goods such as alcohol, tobacco, gambling, food and tea outside home is concerned, Banerjee, *et al*. (2009) find a statistically significant (10.7 percent) decrease in monthly spending which could be responsible for an increase in business investment. With respect to human development aspects they find no noticeable effect on measures such as women's empowerment, expenditures on education and health.

According the findings of the authors, microcredit positively affects business outcomes and alters the composition of household expenditure such that it diverts expenditure form

"temptation goods" to business expansion. Finally Banerjee, *et al*. (2009) conclude that "Microcredit may not be the 'miracle' as it is sometimes claimed on its own behalf, but it does allow households to borrow, invest, create and expand business".

Karlan and Zinman (2009) in their study on "Expanding microenterprise credit access: using randomised supply decisions to estimate impacts in Manila" labeled the findings as "varied, diffuse and surprising in many respects". The study was mainly on the effects of being a member of the credit programme on indicators such as human capital, borrowing, business outcomes, assets acquisition, risk-sharing and investment. Accordingly they find that the formal sector borrowing of those treated groups significantly increased.

With regard to the profitability of businesses, they find a statistically significant increase in profits particularly for businesses owned by male and relatively high-income borrowers. The results suggests that male borrowers were found to employ fewer workers and less likely to search for jobs outside of their own business. This indicates the limited potential of small businesses for employment creation. With regard to the impact on human capital formation, the study shows that male borrowers were more likely to send their children to school. Furthermore, the authors find that the size and scope of treated businesses was found shrinking showing little impact on business investment.

Small businesses have been the sources of income for hundreds of millions of people in developing countries. However, lack of basic financial services such as bank accounts where entrepreneurs can deposit their money is also a commonly observed phenomenon. Given the fact that many of them need to save a certain portion of their daily profits for investments or other purposes, lack of a secure and safe place to save impedes success in business expansion. In their field experiment in Kenya (Dupas and Robinson, 2013:163-164) on saving constraints and microenterprise development examined the effect of access to microsavings on business investment in Kenya using randomised study approach. Women who were market vendors and men who were bicycle taxi drivers participated in the study. A saving account whereby deposits did not earn interest but withdrawals were charged with

fees was opened for participants. Moreover, sample subjects were told to fill log book to record their daily financial activity.

The findings revealed that treated women were found to actively use the bank account opened for them and their average saving increased. The readiness of women vendors to use banking services that did not pay out any interest indicates that they were having problems on accessing saving facilities. Women vendors not only increased their saving but also investment to expand business activities has increased significantly relative to the untreated control group. Another important finding of the study was that expenditures (on food and personal) by the treated women were significantly higher. The overall conclusion of Dupas and Robinson's study was that, microentrepreneurs in Kenya face problems related to saving facilities and that access to such facilities increased both business investment and expenditure especially among women.

In most developing countries the majority of the labour force is employed in small and informal firms. The main issue is that whether such firms have the potential for income growth or merely represent a source of subsistence income for low productivity individuals who are unable to find other employment options. The conventional belief postulates that for microenterprises with low capital base, access to capital is expected to increase the rate of return to capital. The willingness of entrepreneurs to pay higher interest rate for loans obtained from moneylenders offers the proof that there is a high marginal return to capital in their businesses.

Empirical evidence on the extent of returns to capital scarce borrowers who own microenterprises was provided by De Mel, Mckenzie and Woodruff (2008:1329-1333). In a study conducted in Sri Lanka, participants of the survey were selected at random to receive an amount equivalent to US$100 to US$200 either in cash or equipment for their business. The findings suggest that the average profit of those microenterprises who had access to such funds increased by more than five percent. The findings also indicate that businesses owned by male were found to register positive returns while those owned by women registered no or negligible returns.

The study has an important implication for microfinance institutions although it does not directly measure microfinance impacts. The outcome that there is positive return to capital on average is encouraging. The result suggests that profit is more likely to increase when available funds are invested on enterprises. Moreover, microfinance institutions that provide saving instruments create opportunities for microentrepreneurs to save for the purpose of investment. The results also indicate microsavings facilities will have paramount importance when entrepreneurs face capital constraints. In addition, the findings indicate that the return that goes to men (but not to women) has important implication given the fact that many microfinance institutions had been targeting women.

3.3.2 Impact evidence using nonexperimental approaches

In this section, some of the frequently cited impact assessment studies that applied nonexperimental approach are reviewed. These nonexperimental methods include propensity score matching, difference-in-difference approach, and instrumental variables.

Duong and Thanh (2015), apply a propensity score matching and difference-in-difference methods to assess the impact of microcredit on the welfare of rural households in Vietnam. The study proves that per capita income and consumption per capita of the participating households was higher by 5.5 and 7.3 percent respectively than non-participating households implying that microcredit improves living standard of the rural households.

In their study on the impact of group based credit programme on poor households and its gender implications using nonexperimental research design in Bangladesh, Mark Pit and Khandker (1998:982-988) found that, the income of women borrowers increased by 18 percent as compared to 11 percent for men. Moreover, the credit programme was found to have a positive impact on school enrolment of girls' and boys' of the borrowers as well as improvements in physical health of their children. The finding also shows that for every 100 units borrowed from microfinance institutions; the ownership of nonland assets for women and men participants was found to increase by 27 percent and 15 percent respectively.

Using additional data which had become available over the intervening years on the same topic and place, Khandker wrote another paper in 2005. The use of panel data enabled the author to estimate a more reliable impact evaluation on microfinance. The focus was to estimate the effects of household and individual characteristics such as land ownership and education on the demand for loan by households. The findings confirm that resource poor households particularly with insufficient land were found to demand more loans than households that were resource rich. Education of household members' especially female education was found to have a negative effect on the amount they borrow. Using household fixed-effect estimation method to test the impact of credit on consumption, the results show that female borrowers got significant effect on per capita consumption outcomes, as compared to that of male.

Khandker and Samad (2013:13-14), studied the effect of microfinance on poverty reduction in Bangladesh using longitudinal data. Their objective was to investigate whether microfinance does have long-term effect on household level outcomes such as income, expenditure, and poverty and used descriptive and econometric methods. Their findings show that participants of microcredit programmes were found to earn higher income, increase their consumption expenditure, and reduce poverty. An important finding in the study was the length of time in the programme determines the outcome variables. Thus, those who have been with the programmes continuously for the last 20 years were found to have better results. The result reiterates that the length of time has important role for the microcredit programmes to have a meaningful impact on welfare variables.

The study also reports that the share of nonfarm income to household total income was consistently higher for participants as compared to non-participants with 13.8 percentage points and 11.3 percentage points respectively. Though the shares of food and non-food in total expenditures remain the same for both participants and non-participants during the 20 years, non-participants experienced a higher growth in per capita expenditure than did the participants (89.6 percent and 74.6 percent respectively). Similarly between the surveys period of 1991/92 and 2010/11, the real per capita income of programme participants increased by 104 percent while for non-participants it increased by 125 per cent. Unlike

expenditure and income, the poverty rate for participants was significantly lower (16.2 percent) than that of non-participants (23.1 percent). However, the authors admit that their method may not capture the differences in unobservable characteristics among participants.

Carolyn Barnes (2001) assessed the impact of Zambuko microfinance programme on clients who have been in the programme for some time against new clients, those who dropped out from the programme as well as those non-participant comparison groups in Zimbabwe. In the study the comparison group was composed of entrepreneurs who fulfilled the requirements for eligible clients. The programme was followed by training particularly on business management.

Up on controlling for specific initial differences among the study groups, the findings proved that, the microfinance programme has a positive impact on its continuing clients. The results indicate that in 1997 the incomes of those who have been on the programme were significantly higher than the comparison groups. However, in 1999 the difference in income among the study groups was found to be no longer statistically significant. This could be because of the high inflationary pressure during the period between 1997 and 1999. In times of economic slowdown, Stewart, *et al.* (2010) argue that clients who have been beneficiaries of the microfinance programme were observed to fall into poverty compared to non-clients. This is an indication that the macroeconomic environment has significant impact on the outcomes of microfinance interventions. For example higher inflation rates can negatively affect both microfinance institutions and clients. Inflation can deteriorate the real value of money repaid to microfinance institutions particularly if interest rates cannot keep pace with inflation. For household clients inflation is likely to put stress on the economic activities of their enterprises negatively affecting the real value of their revenues.

As far as the impact the programme on asset acquisition is concerned, the results indicate that participation in the programme had an impact on client households acquiring assets. Continuing and departing clients were found to spend more money on durable assets such as stove, refrigerator, etc. Moreover, participation in the programme appeared to have had a positive impact on the rate of school attendance among boys in client households. Moreover,

the extremely poor were observed to consume nutritious food more frequently and more of the departing clients were seen to engage in more diversified income generating activities. (see also Goldberg, 2005).

Barnes, Gaile, and Kimbombo (2001) in their studies on the impact of three microfinance institutions in Uganda using AIMS core impact assessment methods find that programme clients making improvements in their enterprises in the form of adding new products or services, improving or expanding business premises, increasing sales volume, etc. In addition, the study reveals that the programme had enabled a higher proportion of clients (43 percent) to enjoy higher enterprise profits compared to non-clients (31 percent). Moreover, clients were found to establish new enterprise, increased their expenditure on durable assets, expanded the ownership of agricultural land and increased the amount of household income from crop production.

World Bank researchers Bruhn and Love (2009) conducted a study on the effects of new bank branches in Mexico using quasi-experimental research approach involving Difference-in-Difference method. In 2002, Banco Azteca in Mexico simultaneously opened 815 branches in different municipalities of the country. The analysis was based on cross-time and cross-municipality variation in the opening of Banco Azteca in Mexico to measure the effects of opening a branch on low income clients. The findings show that the opening of a new branch led to 7.6 percent increase in the number of informal business owners and 1.4 percent increase in employment, and 7 percent increase in average income in municipalities where branch was opened but no change was observed in formal business. Two reasons could be responsible for this result. First, individuals in the lower income group were the primary targets of the scheme; second, formal business establishments did not have problems of accessing credit from the formal banking sector. The increase in employment was partly due to the opening up of informal businesses that created self-employment opportunities after the opening of Banco Azteca. As a result of this new bank branch which was equivalent to a microfinance institution according to the authors, income increased for both men and women by an average of 7 percent (see also Odell, 2010).

In a series of studies on microfinance in Northeast Thailand, Asian Development Bank economist Brett Colman (2006) introduced innovative methodology to address the problem of selection bias by including applicants who were potential candidates and signed up an application for microcredit but not yet received any loan. Such groups since they had shown their willingness to obtain credit, Colman claims that they represent a suitable comparison group. On the basis of this methodology, he asserts that for two microlending programmes in Northeast Thailand, relatively wealthy borrowers were found to reap the benefits of access to microcredit compared to the supposed target group of the poorest of the poor. The findings show that committee members in the villages were found to have positive and significant impact on wealth and savings. The village banks were found to have had positive and significant impact on women's self-employment for those women who were members of the village committee (Colman, 2006:1622-1624).

Koboski and Townsend studied the effects of setting up village banks in Thailand. Using pre and post programme panel data, they estimated the impact the village bank on credit availability, consumption, saving and investment, growth in assets and income, diversification of income sources, wage rates and business enterprises. The findings suggest that the setting up of the village bank by making credit available increased total borrowing. This increase in borrowing could be an indication of credit constraints faced by households in the study area. The availability of credit also increased consumption expenditure. The authors found that though the additional credit seemed to lower the rate of growth in assets, households' income was observed to rise. As far as the gender effect of credit is concerned they found no significant differences in the behaviours of female and male headed households particularly in agricultural incomes. However, average business income for female headed households was higher by about ten percentage points (Koboski and Townsend, 2009).

Kondo (2007) uses cross-sectional survey, employing a quasi-experimental approach as applied by Coleman (1999). He compares villages with which households can access microcredit with villages where such access is not yet available. To address attrition or drop-out problem, he includes households who graduate from the programme and those who faced

a problem during their stay in the programme as part of his treatment group. A Difference-in-Difference approach was applied to estimate the impact of participation in the lending programme. Per capita income, food and non-food expenditure, savings, household assets such livestock, farm equipment, and appliances as well as investment on human capital such as education and health were used as outcome variables.

Despite the objective of the programme the findings reveal that only 10 percent of the sample respondents were poor while many clients were above the poverty threshold. The result shows that per capita income, food and nonfood spending increased significantly. The programme appears to have a positive and highly significant effect on the opening up a personal savings account along with the absolute amount saved. With regard to ownership of enterprises, 93 percent of the existing clients own enterprises as compared to 87 percent and 78 percent for new clients and non-clients respectively. Existing enterprises on average employ three individuals. When breaking the impact by socio-economic groups Kondo found that borrowing positively affects wealthy borrowers and this is similar to the results obtained by Colman (2006) in Thailand.

In a cross-sectional survey that incorporated established and new clients as treatment and comparison groups on the impact of Sinapi Aba Trust (SAT), a leading NGO microfinance provider in Ghana, Adjei, Arun, and Hossain (2009:271-282) found that the amount of loan has positive significant effect in improving the accumulation of financial, human and physical assets. In the case of financial assets, the amount of loan has a significant positive effect on saving deposits. A surprising finding from the study is the length of time measured by the number of months that individuals have been with the programme was found to have reduced the amount of saving deposits though not significant. This indicates that the more the clients stay in the programme the less will be their saving deposits. With regard to health and education, the result shows that clients who have been served by the programme for quite some time contributed significantly to the health of their household members. While the amount of loan was found to be positively significantly affect expenditure on health and children's education, the length of time did not had significant effect. On physical assets, the findings disclosed those treatment groups were strongly associated with increased

expenditure on physical durable assets. The authors concluded that treatment clients managed to diversify their asset holdings which provide protection against risk and vulnerability (see also, Goldberg, 2005).

The role of microfinance on food consumption and ensuring food security indicate mixed results. Zeller and Sharma (1998) study indicates that households in the bottom income group spend a major proportion of their budget (91 percent) on food. The findings further show that in order to supplement their budget the poor use any additional resources such as credit for consumption related purposes. This is a typical characteristic of the poor and explains the composition of their expenditure.

On the other hand in a study in Malawi, by Diagne (1998) reports that the average daily per capita calorie intake of non-clients of microfinance scheme was found to be higher than those who participated in a microfinance programme. The author suggests that the reason could be that either the clients are not spending their marginal income on food; or the type of food they purchase contains low in nutrition content. Overall, the study concludes that the provision of microfinance may not have significant effect household per capita expenditure and the daily calorie or protein intake.

Doocy, Teferra, Norell, and Burnham (2005:2374-2379) conducted a study on the coping capacity and microfinance programme outcomes in drought affected rural Ethiopia. The study used cross-sectional study design that involved multiple comparison and control groups on established and incoming clients. The findings show that when evaluated on the sample population similar results were observed with respect to food security, nutrition content, risk management measures of nutrition status, diet, household food security, and coping mechanisms among the treated and control households. However, a disaggregated analysis in Sodo region, which was highly hit by drought and more food-insecure of the two sites (Sodo and Adama regions), significant differences were observed in terms of household food security and nutritional status. Established female clients and their households performed better on a variety of indicators when compared to the control groups, suggesting that microfinance programmes may have a positive impact on household food security and

physical well-being in selected households in the context of drought and food insecure environments.

3.4 CONCLUSION

Development is a multidimensional process which involves economic, social, institutional, and cultural transformation whose outcomes are manifested in the form of reductions in poverty, inequality, unemployment, emancipation from social and economic exploitation, enhancement of capabilities, and improvements in the quality of life. Access to financial resources whether formal or informal has therefore, been instrumental in the achievement of development objectives. Formal financial institutions as observed in many of the developing countries have been inaccessible for the poor particularly in rural areas for various reasons such low collateral on the part of the poor, low economic activities in rural areas high administrative costs, information, monitoring, and enforcement problems for formal banks, etc.

Microfinance programmes were introduced in the 1970s with innovative methodologies to overcome the challenges of formal financial institutions to serve the poor. In the past half a century, microfinance has been lauded as an alternative of availing financial resources for the poor to improve their living conditions, perhaps with mixed results. Microfinance is expected to positively affect the livelihood of clients through pathways such as income generation, consumption-smoothing, risk reduction and coping, asset accumulation, enterprise creation and expansion, saving mobilisation, etc.

The empirical literature shows that the impact of access to micro-financial resources is as diverse as the contextual conditions themselves. One factor responsible for such diversity is the empirical approaches employed to estimate those impacts. The empirical literature reviewed in this Chapter had made use of a variety of empirical approaches to measure the impact of microfinance programmes. The different empirical approaches can be aggregated into experimental and nonexperimental approaches.

The challenge of any impact evaluation methodology is to identify whether a certain programme intervention brings the desired result and examine the level and nature of its impact on the intended beneficiaries. In doing so, the hurdle remains how to account attribution, i.e., isolating the effects of the programme or intervention from observable and unobservable factors as well as potential selection bias during the evaluation process (Khandker, *et al.*, 2010). The experimental and nonexperimental approaches have their own distinct way of identifying programme impacts and accounting for selection bias. However, both approaches share one common feature: they only account the impact of a programme on participants by ignoring outcomes on non-participants.

The experimental approach involves the random assignment of participants into the treatment and comparison groups. Randomised Control Trial (RCT) is a typical example of this approach. When done properly, randomisation creates a control group that comprises of participants with identical distribution of observable and unobservable characteristics to those in the treatment group. Therefore, random assignment is expected to overcome the problem of selection bias inherent in impact assessments. Although an experimental approach has the potential to overcome selection bias, and make an ideal casual inference about the impact of a programme without conditional dependence on observable characteristics, it has also some limitations. Randomisation is expensive to implement and requires rigorous administration and monitoring and also involves ethical issues. In randomised experiments, subjects may be selected at random but allocation of the treatment variable may not be done at random which practically creates 'randomisation bias'.

Despite the potential limitations, randomised evaluation remains by far the most robust technique to estimate the impact of a certain programme (Bryson, *et al.*, 2002). However, many programmes involve ex post evaluation and can be carried out using nonexperimental approach. This approach comprises a variety of methods the choice of which depends on programme characteristics, and the nature and quality of the data available. One common feature shared by nonexperimental methodology is that the counterfactual is absent and thus assumptions have to be made in order to infer the causal effect due to programme intervention on the outcome of interest.

Two broad categories under nonexperimental approach are the before-after and cross-section estimators. The before-after method involves the comparison of outcomes of groups of individuals after their participation in a programme with outcomes of the same groups before participation. An example of before-after estimation is the Difference-in-Difference approach which depends on comparison of outcomes for participants and nonparticipants before and after the intervention. Baseline data with follow-up survey is required on both treatment and control groups to calculate the difference in mean outcomes before and after intervention. The Difference-in-Difference approach requires longitudinal or panel data or repeat cross-section data. The main assumption under this approach is that the difference between the true post-programme counterfactual and their pre-programme outcomes averages out to zero. The strength of this approach is it rules out the assumption that selection of treatment and control groups should be based solely on observed characteristics. It also assumes the effects of unobservable characteristics although they are time-invariant or fixed over time. The latter assumption, however, is also the major drawback of the method, because counterfactual outcomes that belong to nonparticipants are not time-invariant. They rather change over time as a dynamic response to the intervention.

When randomisation is not feasible and longitudinal data are not available, Propensity Score Matching (PSM) method which uses cross-sectional data becomes appropriate alternative to assess the impact of an intervention. According to this method, selection is purely dependent on observed characteristics. For every participant in the treatment group a match of nonparticipant in the control group exists that shares similar characteristics. The difference in mean outcomes between the treated and control groups then is attributes to the programme's effect. The PSM method is based on two assumptions. The first assumption is the Conditional Independence Assumption (CIA). The assumption says that once differences in observable characteristics between the treatment and comparison groups are controlled through regression, the difference in outcome is attributed to the effects of the programme (Bryson, *et al.,* 2002). The assumption ignores the presence of unobserved differences between the two groups and thus do not affect outcomes.

The second assumption is based on the fact that the propensity score that shows the probability of participation based on observed factors needs to lie in the common support region for matching to take place. Those treated groups whose propensity score fall outside the common support would be dropped and excluded from the estimation of treatment effects. Therefore, one strength of the matching method is it makes explicit that a common support must exist for matching and subsequent estimation of treatment effects to take place. Another advantage of PSM is that it reduces the curse of dimensionality. Because large observable variables that could potentially show similarity between participants and nonparticipants would be reduced into a single index i.e. the propensity score. PSM also avoids ethical issues that are inherent in randomised control trial. Although PSM requires huge data, data generation is less costly relative experimental approach. Furthermore, matching methods are non-parametric indicating that no specific functional form assumption is required like for example OLS. Where there exists a credible common support, PSM enhances the comparison between treated and controlled groups, and lowers potential bias in estimating programme effects (Bryson, *et al.;* 2002; Khandker, 2010). However, PSM is not without limitation. The first drawback is that it is based on untestable assumption, particularly the CIA is untestable. Unlike random experiment, the CIA only considers observable variables in the process of selection by ignoring unobserved variables as if they do not have any effect on selection and outcome variables. Furthermore, in the absence of sufficient overlap or common support, PSM may result in biased estimates.

On top of these, microfinance institutions and their activities as well as their impacts on clients depend on the prevailing socio-economic conditions of each context. The impact of access to microfinance is different for rural and urban areas, female and male clients, market and financial structures and competitiveness, cyclical fluctuation in the economy, level of poverty and inequality can be mentioned. Therefore, any conclusion regarding impact evaluations of microfinance must take in account the specific contextual and socio-economic condition microfinance institutions operate and the methodology of the research design.

This study employs PSM method for two basic justifications. The first one is related to data considerations. The study did not have the privilege of baseline data and follow-up surveys.

Therefore, it is purely dependent on cross-sectional survey where PSM method is more fit and appropriate. Second, the programme over which the study is based on has been in operation for quite a long period of time and thus the estimation of programme impact is an ex post assessment.

CHAPTER 4

CONCEPTUAL FRAMEWORK AND METHODOLOGY

4.1 INTRODUCTION

This Chapter consists of two sections in which the first section describes the conceptual approaches adopted for this study. The second section presents the methodology employed to collect, process and analyse the data.

Two approaches namely the Household Economic Portfolio Model (HEPM) and Sustainable Livelihood Approach (SLA) were adopted to conceptualise the findings obtained from the data analysis. Both approaches are relevant as they emphasise on the household as a unit of analysis in production and consumption as well as resource mobilisation and allocation decision making processes. The two approaches focus on the client household as a unit of analysis in assessing the impact of the treatment variable. Furthermore, both approaches consider micro-financing as the provision of additional financial resource so that households would optimally exploit their assets and resource endowments to achieve improved livelihood outcomes.

The methodology selection presents information about the study design, data sources, data collection instruments, and the sampling procedure. In addition, the statistical and econometric used to analyse the data set are explained.

4.2 CONCEPTUAL APPROACHES

Households in rural areas own certain resources (assets) and engage in a multiple of production activities. Some of these activities are geared towards the market and others for home consumption (Sebstad *et al*., 1995). This shows that there exits interdependence between production and consumption structures. An approach that integrates assets and their outcomes in the process of production and consumption is, therefore, important to understand the patterns of resource mobilisation and allocation decisions of the household. In the context of an integrated approach, microfinance is assumed to complement the resource owned by

the household particularly their financial resources (Alia, Ashta, and Ratsimalahelo, 2014). Furthermore, from a rural development perspective, the household remains at the center of analysis to understand the behaviour of small farmers and their strategies of combining different resources to achieve certain livelihood outcomes. Two approaches namely the Household Economic Portfolio Model (HEPM) and the Sustainable Livelihood Approach (SLA) that place the household at the center of livelihood analysis were adopted to conceptualise and interpret the findings of the study. These two approaches link how microfinance could contribute to household livelihoods.

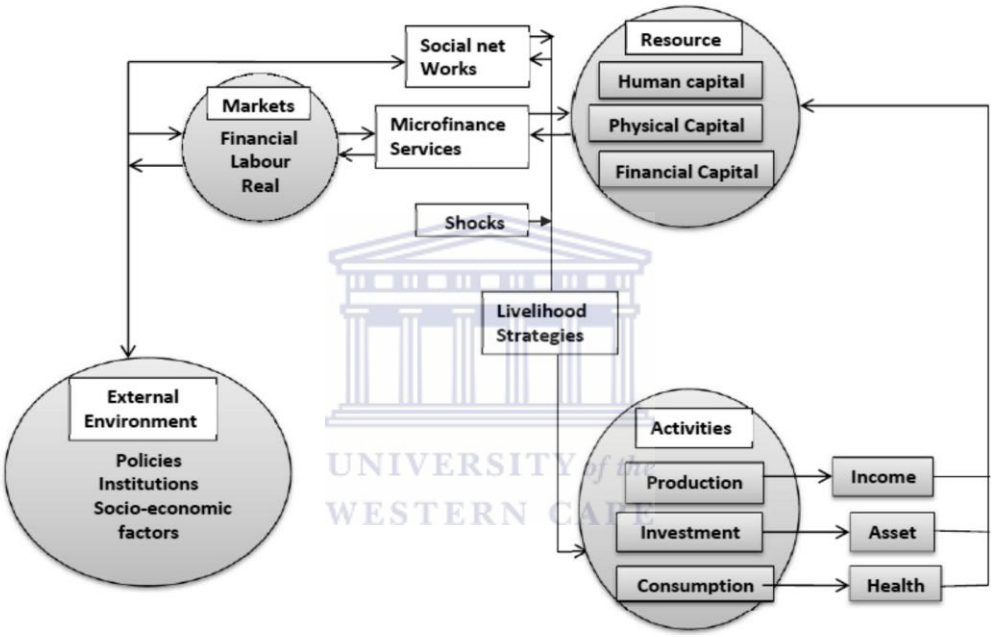
Poverty Lending Approach (PLA) and Financial Sustainability Approach (FSA) have been commonly used in microfinance impact assessment studies. The PLA focuses on how microfinance institutions should expand their outreach so that the poor would be included into the financial system. This approach postulates that subsidised loans should be provided by the government to alleviate poverty. The FSA emphasises on institutional sustainability on the assumption that microfinance institutions should charge their clients market interest rate and fully recover costs in order to remain financially stable. Therefore, both approaches focus on the institution and its procedures and impact is assessed in terms of the extent of outreach and the degree of financial sustainability as opposed to the client's livelihood conditions (Robinson, 2001; Zhang and Wong, 2014; Mago, 2014). Unlike the HEPM and SLA, the PLA and FSA approaches are not client oriented. For this reason, PLA and FSA were not employed in the present study.

4.2.1 The Household Economic Portfolio Model (HEPM)

The HEPM is a dynamic conceptual model developed by Chen and Dunn (AIMS, 2001; Marr, 2002) and it explains the interactions among a bundle of resources, economic activities and the circular flows between them. Resources include human, physical and financial resources, and economic activities are related to production, consumption and investment activities carried out by the household. Resources are allocated to economic activities and the returns from such activities that go to resource accumulation constitute the circular flow. The model presents a set of links whereby resources affect economic activities and each effect

becomes a cause in its own right generating further effects (Al-Al-Mamun, Adaikalam, Mazumder, and Wahab, 2011:12983; Dunn, 1996). The approach looks at the household, and its economic activity and the local society in which it is embedded and traces the interaction among them. Therefore, in this study, it is assumed that microfinance affects household resources and household livelihood activities. The links between household activities and resources are illustrated in Figure 4.1.

Figure 4.1: Microfinance and the Household Economic Portfolio Model



Sources: Adapted from (Scoones, 1998) and (AIMS, 2001),

In the figure above, household resources are classified as human, physical and financial capital. This resource pool may be generated from household initial endowments and from external sources, such as microfinance institutions and social networks. The resources of the household provide the base to undertake the household's activities and are allocated through various joint and individual decision-making processes. The actual distribution of resources among various activities depends on the household livelihood strategies which are built on available resources, vulnerability and other contextual conditions.

In the bottom right panel, households use their resource pool for consumption, production and investment activities. The flow also represents the outcomes of those activities labeled as income from production, asset accumulation from investment and maintenance of health from consumption which in turn contributes additions to resources. Similarly the bottom left panel of the framework refers to the effect of the external environment. The impact of any intervention programme can be affected by a wide range of external factors. Such factors are context specific and often dynamic.

For example government policies and regulations may affect the operations of microfinance institutions through their influence on the financial market, input and output markets, etc. Government policies on interest rate, exchange rate, import duties, taxes and subsidies have important implications on the operation of microfinance institutions as well as their clients. External contextual factors also determine patterns of behaviour in a society. Institutions determine access and allocation of productive resources, safety networks, negotiations and relations and exert positive or negative influence on the operations of microfinance clients and institutions. Therefore, understanding institutional processes and mechanisms allows the identification of constraints and opportunities to household livelihoods (Scoones, 1998). Microfinance institutions operate in a local socio-economic context that determine the profitability of small and microenterprises, the structure of markets, income generating alternatives, livelihood diversification options, etc. Therefore, the analysis of external factors has significant contributions in understanding and analysing the impact of microfinance products and services.

4.2.1.1 Fungibility Assumption in the HEPM

The choice of the HEPM as a conceptual framework is justified on the following grounds. Firstly, the model incorporates concepts how to handle fungibility, justify the case for attribution and identify the domains of impact on household livelihood outcomes. The assessment of microfinance impacts requires addressing the issue of fungibility. Fungibility is defined as a situation where an asset, resource or good can be used interchangeably in a multiple of functions (Nguyen, 2007). As indicated in Chenn and Dunn (1996), and AIMS

(2001), microcredit is a fungible resource in a sense it may be alternatively invested in any of the economic activities stipulated by the HEPM. In practice, a household can use loans from microfinance for a variety of purposes. It is unrealistic to assume that all loans provided to households are used exclusively for production purposes (Nghiem, 2007).

The HEPM holds the assumption that credit is fungible and can be utilised by the household in whatever way it deemed necessary. Therefore, it is inappropriate for an impact evaluation to focus on a single economic activity while ignoring the household economic portfolio in which it is embedded. The recognition and incorporation of microcredit fungibility into a household model helps to measure the full range of impacts without making any prior assumptions about how the loan is allocated within each household activity. In addition, the HEPM acknowledges that enterprise profits are also fungible in the sense that they may be used for non-enterprise expenditures. Therefore, even if the loan is invested to an enterprise, the impact of it may still be evident in changes related to other livelihood outcomes. The HEPM also addresses the issue of fungibility by accounting for the flow of resources among various production, investment, and consumption activities within the household. It provides the basis for understanding how changes in one activity may come at the expense of or complementary to changes in another activity (Al-Mamun *et al.,* 2011).

Secondly, the HEPM provides a conceptual framework to model the ways households, and individuals within households, use microfinance services and products to promote, protect, manage, and increase their resources and activities. It identifies impact pathways at the household, enterprise, and individual levels. When households access and receive microcredit, it immediately increases the resource available for allocation to various economic activities. The identification of these plausible impact paths within the HEPM provides the basis for generating a set of hypotheses to be tested in the impact evaluation processes (Marr, 2002).

The framework described in Sebstad, *et al.* (1995) discusses the channels by which interventions may lead to positive changes at the household, enterprise, individual, and community levels. Changes in household income, expenditure, ownership of asset and

general household welfare represent impact domains. The following section elaborates the domains of impact that can be generated by the HEPM at the household levels.

4.2.1.2 Domains of impact at the household level

Improvements in household assets that include physical, human, financial, and natural resources along with the change in income as well as expenditures constitutes improvements in economic welfare at the household level. As outlined in Sebstad, *et al.* (1995), AIMS (2001), Marr (2002), Schreiner, *et al*. (2003), Ellis (1999) microfinance resources are believed to have positive effects on several household level variables. These effects are grouped as (1) asset accumulation effects; (2) consumption-smoothing effects; and (3) income generating effects.

Asset accumulation effects are observed either in restoring depleted assets, or acquiring new assets, or both. Microfinance resources may be invested directly in household assets or some of the increased income from microenterprises, agricultural and non-agricultural activities that receive microcredit may be used to accumulate additional assets. In consumption-smoothing, microfinance enlarges buffer or insurance stocks, or ensures stability of consumption patterns. An important component of consumption which has strategic significance is food. Increased expenditures on food may suggest improved nutritional status and well-being of household members which can also positively affect the health of the members and their productivity. Increased spending on food may be facilitated directly through the use of microfinance resources or indirectly through the use of increased income generated from credit supported microenterprise activities.

As far as income generating effects are concerned, microfinance promotes investment in existing microenterprises, or investment in new microenterprises. Microfinance offers the household a range of options to diversify their income sources. Diversification of income sources is a common strategy for poor people to increase their overall income levels, manage the risk of dependence on a particular income source, and deal with seasonal fluctuations in income. The aggregate effect of microfinance results in exposure to risks and shocks

reduced, resilience improved, stability and growth in consumption and income strengthened, and empowerment

The HEPM is, therefore, a dynamic and flexible model as it addresses the issues of fungibility which is very important in understanding the role and impact of microfinance resources with in the household resource mobilisation and allocation decisions. Furthermore, the approach establishes a plausible case for attribution and identifies the various causes and impact domains of microfinance at household, enterprise and individual levels.

4.2.2 The sustainable livelihood approach (SLA)

Another approach that could be used as an organizing framework to explain and understand the livelihood resources, strategies and activities at household is the Sustainable Livelihood Approach (SLA). Livelihood studies were brought to the center of development studies in the late 1990s and the beginning of the new millennium when the so called Sustainable Livelihood Framework was strongly promoted by the Department for International Development (DFID), the British State Development Cooperation Agency (De Haan, 2012: 346; Mago, 2014). The central element of the sustainable livelihood approach proposed by DFID is that its analytical structure makes it easy to understand how the various factors such as the vulnerability context, household assets, and institutions affect livelihood outcomes, and show how each of these factors relate to each other.

In rural areas of the developing countries, the household is considered to be the basic unit of production and consumption given its physical, financial, human, social and natural resources at its disposal. Within the livelihood approach, a household has been described as “a site in which particularly social and economic interdependencies occur between groups of individuals with diverse preferences” (Ellis, 2000). Poor people exercise a variety of innovative activities in their effort to survive difficult situations. The resources and entitlements at their disposal determine to a large extent their coping capacity.

Fouracre, (2001) argues that "a policy of sustainable rural livelihoods focuses not on the needs of the rural people, but rather, builds on the existing assets of the poor, both at the village and individual level". Cahn (2002) further notes that the SLA focuses on what people have rather what they do not have. Therefore, the approach recognises five assets or capitals namely human: physical, social, financial, and natural. These assets comprise the portfolio of the household out of which they construct their living. Regarding the importance of livelihood assets, and deriving from Sen's capability approach, Bebbington (1999:2022) extended the meaning of assets to include that assets are not only resources that people use in building livelihoods, but also they are resources that give people the capability to be and to act. On the importance of assets, Moser and Dani (2008) suggest that "assets are the resource endowments and capabilities that sustain and enhance people's livelihoods". The type and amount of each asset that a household holds is a function of past investment and accumulation strategies and activities, which in turn are shaped by social, cultural, political and economic opportunities and constraints.

Within the context of SLA framework, the provision of financial resources such as microfinance, promotes access and entitlements as well as strengthens household assets. The link of microfinance with sustainable livelihood framework helps to assess how microfinance supports rural livelihoods by supplementing and strengthening the five assets or capital owned by the household (Mago, 2014).

Rural households in order to manage as well as improve their livelihood, they pursue a 'livelihood strategy' that may comprise a number of different activities such as farming, herding, fishing, off-farm employment and the exploitation of natural resources through hunting and gathering with the objective of income generation, risk reduction, food security, sustainable management of natural resources. In order to engage in these activities, households mobilise the assets at their disposal (Mago, 2014).

In general, a livelihood activity is said to be sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Carney, 1998). Any activity that

undermines the household's long-term productive potential is thus considered to be un-sustainable.

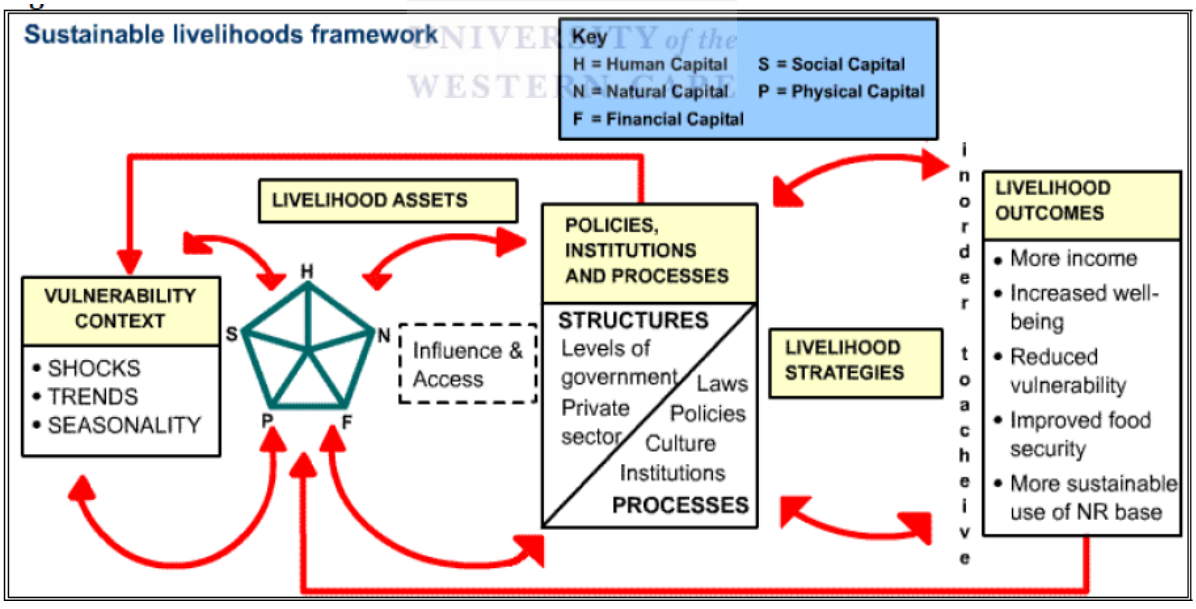
Generally, the SLA has the following merits. First, the approach people centered follows a bottom-up approach and participatory methods. As De Haan (2012) puts, it emphasises on poor people's assets and daily needs, rather than the top-down intervention methods practiced so widely by other international agencies. Moreover, it is important to note that "livelihoods rarely refer to a single activity. It includes complex, contextual, diverse and dynamic strategies developed by households to meet their needs" (Gaillard, Maceda, Stasiak, Le Berre, and Espaldon, 2009:121). Second, it allows for an interaction in a wider context in which the poor organises their livelihood strategies. The approach acknowledged that these strategies are embedded in structures governed by institutions. Institutions as defined by Scoones (1998) are regularized practices (or patterns of behaviour) structured by rules and norms of society which have persistent and widespread use in a specific community. Such institutions, directly or indirectly, mediate and determine access to livelihood resources which in turn affect livelihood strategy options and, ultimately, the scope for sustainable livelihood outcomes.

The wider context is considered as a fundamental factor because an important part of the poverty alleviation and livelihood improvement policies and interventions that enable or prevent the poor from organising effective livelihood strategies are carried out in a given context. Policies and interventions are said to be effective if they facilitate the opening up of more opportunities than constraints, reduce vulnerability, and improve well-being and livelihood as well as greater sustainability. For example, the opportunity to gather firewood in the forest; use water for irrigation from the village well; obtain food from the compound's garden; or to obtain information about prices of livestock or the possibilities getting temporary wage employment elsewhere in the village or region depend on the notion of accesses and claims which again are determined and governed by institutions (De Hann 2012:347).

Third, as put by Krantz (2001), the SLA recognises that there is no automatic relationship between economic growth and poverty reduction. Economic growth can contributes to poverty reduction if it enhances the capabilities of the poor and enable them take advantage of the expanding economic opportunities. The approach further realizes that poverty is multidimensional involving not only low income but also poor health, illiteracy, lack of social services and capabilities, deprivations of basic rights, inequality as well as a state of vulnerability and powerlessness, etc.

Therefore, the strength of the SLA rests on the fact that it offers a holistic approach on the resources and assets owned by households in constructing their livelihoods. It also facilitates an understanding of the underlying causes of poverty by focusing on the various interlinked factors that directly or indirectly enhances or limits the poor's access to resources, and their livelihoods rather than focusing on one factor such as income (Kartnz, 2001). Below is a diagrammatic representation of the Sustainable Livelihood Framework used by DFID.

Figure 4.2: Sustainable livelihoods framework



Source: Carney, 1998 in Mago, (2014)

The above framework portrays the different mechanisms through which livelihood assets, strategies, and outcomes are interlinked in a given contextual and vulnerability contexts. The

vulnerability context is affected by external factors which are outside the control of households. The interrelationships among the various factors will determine livelihood opportunities in a positive or negative way. The livelihood outcomes expressed in terms of increased income, improved well-being, reduced vulnerability, improved food security and sustainable management of natural resources are the products of the five principal assets or capital and the strategies pursued to combine them (Alinovi, D'Errico, Mane and Romano, 2010).

The framework also shows that policies, institution and processes that are part of the wider context affect livelihood assets and outcomes. They determine who gains access to which type of asset, and define what range of livelihood strategies is open and attractive to people (Carney 1998 cited in Krantz, 2001). Livelihood assets are transformed into livelihood strategies through the mediation of institutions and organisations embedded in the laws, policies as well as cultural norms of a given community (Alinovi, D'Emico and Romano, 2010).

In summary, the following points can be derived upon comparison of the HEPM and SLA in the context of this study:

- Both approaches focus on the household as a unit of analysis
- The HEPM and SLA are part of the wider Household Economy approach (HEA) which a livelihood based approach and dynamically explains the way people use their assets, mix their strategies to achieve their livelihood objectives.
- Both approaches recognize that finance compliments initial resource endowments of the household
- Both approaches acknowledge that the provision of microfinance promotes livelihood diversification and stability by smoothing consumption and diversifying income sources
- Targeting household economic portfolio through microfinance has been assumed an increasing importance as it emphasises protecting their resources and reducing their vulnerabilities.
- Both approaches emphasis understanding of the household dynamics in terms of resource mobilisation and allocation and can help researchers and policy-makers to understand the livelihood strategies pursued.
- HEPM acknowledges fungibility of microcredit in the decision of the household.

4.3 RESEARCH DESIGN AND METHODOLOGY

The study made use of quantitative research design involving cross-sectional data. Survey data was collected from rural households to assess the impact of SMCP on household livelihood. The survey covered both treatment and comparison households employing nonexperimental approach. The study made use of two-stage cluster and random sampling procedures to ensure the representativeness of sample subjects and wider generalizability of results. Data analysis was carried out using descriptive statistics and econometric models. A logit regression model was used to identify the factors that determine household's participation in SMCP. A propensity score matching model (PSM) was applied to measure the impact of participation in the SMCP on profits, food and nonfood consumption spending, household assets, livestock assets, and savings. A detailed account of the methodology employed is presented as follows.

4.3.1 Sampling procedure

A probability sampling has been applied in determining the sampling frame. In probability sampling, the elements in the population have some known chance or probability of being selected as sample subjects (Turner, 2003). Probability sampling ensures the representativeness of the sample subjects and wider generalizability of results. A two stage cluster sampling was employed at regional and branch levels to select representative regions and branches eligible for further sampling.

A rule of thumb sampling approach as applied by the Consultative Group to Assist the Poor (CGAP) was adopted to determine the sample size. As a default, the CGAP recommends a sample size of at least 500 and that a 2-to-3 ratio of clients to non-clients is maintained in all clusters in an impact assessment study (Henry, Sharma, Lapenu, and Zeller, 2003). Therefore, a total of 500 household were interviewed, 200 treated households and 300 comparison households. Van de Ruit May, and Roberts, (2001) argue that the ratio of 2 treated households to 3 control households allows for greater diversity in the control households sample and thus the number of comparison subjects need to be greater to capture these differences. Furthermore, the propensity score matching model applied in this study to

estimate the impact of the intervention variable requires the selection of more control households relative to treated clients for the purpose of matching the observable characteristics or covariates between the two groups.

As shown in Table 4.1, the SMCP operates in all regions of Eritrea. For the purpose of efficiency and administrative convenience the SMCP divides the country into seven geographic regions. These regions are Maekl, Debub, Southern Red Sea, Northern Red Sea, Anseba, Barentu, and Tessenei (SMCP, 2013). The SMCP operates in each of these regions with varying degree of intensity and success. Accordingly, the seven clusters have been considered in determining the regions to be included in the sample. However, some cluster regions were excluded from the sampling process. For example, regions including the Northern Red Sea and Southern Red Sea were excluded from the sample, because according to the SMCP authorities operation in these regions is relatively weak and the outcome was not satisfactory.

Table 4.1: Distribution of sample respondents at regional level

Cluster/ regions	**Number of new clients**	**Weight**	**Control households**	**Treated households**
Maekel	-	0	0	0
Debub	563	0.35	105	70
Anseba	-	0	0	0
Barentu	1040	0.65	195	130
Tessenei	-	0	0	0
Northern Red Sea	-	0	0	0
Southern Red Sea	-	0	0	0
Total	**1603**	**1.00**	**300**	**200**

Source: SMCP, 2014

The Maekel region is excluded from the sample for the reason that rural livelihood in the region is highly influenced by urban activities and livelihoods. Since the focus of the research is on rural areas, the researcher believes that rural areas that are highly influenced by urban livelihood will contaminate the real livelihood activities carried out by the rural people.

Thus, finally regions including Debub, Anseba, Barentu and Tessenei were clustered for simple random sampling procedure.

Accordingly Debub and Barentu has been randomly selected for further processing. The number of clients selected for the survey was in proportion to the total number of new clients per region. Equal proportion sampling was adopted as applied by Van de Ruit *et al*., (2001). The actual proportion of new clients applied for SMCP in Debub and Barentu regions was uneven; there were more new clients in Barentu than in Debub. On the basis of the 2-to-3 ratio framework, comparison and treated clients in Barentu comprised 65 percent of the sample, and that of Debub region made up the remaining 35 percent of the sample. The SMCP has 16 branch offices in both regions where each region having eight branches. Using excel random number generator, two branches from each region (four from both regions) were randomly selected. The list of client households (treated and comparison) was obtained from the registry of the branch offices and random selection was made to identify the sample respondents. Once sample respondents were selected, they were interviewed by data enumerators in their respective villages.

Table 4.2: Distribution of sample respondents at branch level

Regions	Branch	Treated Clients	Comparison clients	Total
Barentu	Tokombia	79	104	183
	Gogne	51	91	142
Debub	Mendefera	52	80	132
	Dekemhare	18	25	43
Total		**200**	**300**	**500**

Source: SMCP, 2014

Assessing the impact of microfinance programmes requires careful selection of households due to the inherent problem of selection bias. Coleman (2006) argues that the assignment of households into clients and non-clients simply on the basis of their membership to a certain microfinance programme may lead into a self-selection bias due to differences in unobserved characteristics between members and nonmembers. When differences between the two

groups can be measured and observed such as age, education, asset holdings, etc., they can be statistically controlled for when estimating the impact of the programme. However, if the differences between clients and non-clients cannot be observed and measured (e.g. business attitude, entrepreneurship skill, risk preferences), direct comparison between clients and non-clients is more likely to yield a biased impact estimates about a microfinance programme. This means that households with positive business and entrepreneurship attitude would be more likely to join a microfinance programme and expect to have higher welfare measures such as income and expenditure even without the programme. Therefore uncontrolled comparisons between clients and non-clients might attribute positive outcome of a microfinance programme.

In this study, sample households were classified between treated households and controlled households. The treated households refer to the treated group and the nontreated ones refer to the control or comparison group. The treated households are defined as those households who have been members in the SMCP for more than three months. In other words, these households are the established or continuing clients in the SMCP. The comparison households are defined as those new clients who have applied for loan and waiting for approval or due to receive loans and/or those clients who received loans within less than three months. Three months is selected as cut off period in consultation with the SMCP authorities with the assumption that given circumstances in rural areas new clients are not expected to realize the impact of accessing loans in less than three months period. Therefore, on the one hand appropriate statistical methods is applied to control the observed differences between treated and comparison households, and on the other hand, the inclusion of new clients in the sample is expected to reduce the selection bias due to an unobservable variables. The fact that new clients are applying for microcredit services is assumed to indicate the similarities between the two groups in terms of the unobserved characteristics.

4.3.2 Data source and collection methods

This study employs a cross sectional design in the data collection process. This design was chosen because there is no baseline data available that could serve to employ time-series or

longitudinal design. Furthermore, cross-sectional design not only requires less time and low cost but also has the proven capability in measuring impact of microfinance relatively accurately (Al-Mamun, Adaikalam, Mazumder, and Wahab, 2012). Quantitative and qualitative data were collected using structured and semi-structured questionnaire on a variety of household, programme and village variables (see appendix, II).

The questionnaire was designed in such a way to capture the necessary information on household level livelihood indicators as well as programme and village related information. The questionnaire is divided into around ten core parts including on socio-demographic information, client and loan characteristics, non-business supplementary income, business or microenterprise level information, agricultural information, household living standard indicators, food and non-food consumption and spending, livestock and household level assets, household vulnerability and coping mechanism as well as village level information. Questionnaires developed by NIDS (National Income Dynamics South Africa) and AIMS (Assessment of Impact of Microfinance Services) were consulted during the preparation of the questionnaire for this study. Furthermore, group discussions were held with key informants such as village administrators and SMCP managers and loan officers at all levels to complement the quantitative data collected through a structured questionnaire. As specified in the sampling procedure in Tables 4.1 and 4.2., the collection of primary data took place from January to May 2014 in the rural areas of Barentu and Debub regions

A pilot test was carried out on 50 respondents to evaluate for consistency, reliability, clarity of the instrument and avoid duplication as well as to estimate the time required during data collection. With minor revisions and modification to some questions, the responses obtained from the pilot test indicated that, the instrument was found to be reliable in terms of the information it intends to elicit. However, the need to translate the instrument from English to the Tigrigna (local language) was found to be important. As a result, the instrument was translated into Tigrigna and translators were recruited for those respondents who do not understand Tigrigna during the actual data collection when required. Data enumerators were recruited and trained on the basics of interview techniques and detailed explanation of the questionnaire. The enumerators interviewed on average of six respondents per day and the

interview took approximately 40 minutes. A graduate statistician was recruited to design and code the template for data entry. Since the questionnaire used mostly close-ended questions, the coding process was fairly easy and straight forward except for those open ended questions. The template for data capturing was designed using CSPro version 5.0 package. The software has an inbuilt error trap mechanism and validation routines to ensure that data coding and entry errors were kept to a minimum.

The fact that the questionnaire was pilot-tested, the clear outline of the methods and procedures employed in the sampling frame and the random selection of sample respondents are expected to improve the reliability of the instrument. Furthermore, the inclusion of a series of interrelated questions in the questionnaire is expected to ensure the validity of the instrument. An effort was also made to measure the reliability of the responses by testing the internal consistency of the items in the instrument. According to Tavakal, and Dennick (2011), internal consistency refers to the extent to which the items in an instrument measure the same concept. One of the most frequently and widely used measure of internal consistency reliability is the Cronbach alpha coefficient.

The Cronbach alpha statistic measures an overall inter-item correlation where the values range between 0 and 1. The closer Cronbach's alpha coefficient is to 1, the higher the internal consistency reliability. In general, reliabilities less than 0.60 are considered to be poor, those in the 0.70 range are acceptable, and those over 0.80 are good (Griffith, 2015). In the present study, ten variables were arbitrarily chosen from the questionnaire and a reliability coefficient (α) was computed using STATA version 12 software, and the result was found to be good with Cronbach's alpha of 0.8341. Since the items selected are not on the same scale, the standard deviation was specified so that the scale and its reliability were based on the sum of standardized variables.

4.3.3 Methods of data analysis

The main aim of the study is to estimate and analyse the impact of microfinance on household livelihood as measured by selected economic indicators and examine its role in promoting household livelihood diversification.

In an attempt to address the research questions, various descriptive indicators such as frequency distributions, averages, percentages, and cross-tabulations were reported and presented from the field survey data collected to draw appropriate inferences. Household demographic characteristics, socioeconomic and livelihood profiles, and information on household assets, strategies and activities pursued by households were examined using descriptive analysis. Furthermore, appropriate statistical tests such as the T-test and P-values were computed to evaluate the statistical significance of the mean difference between the values of the treated and comparison households. The results from the descriptive statistics also served to develop and specify the appropriate variables to be used in the econometric analysis. As a result a logit and propensity score matching models were applied to determine the factors that affect households' decision to participate in SMCP and estimate its impact of in rural Eritrea.

4.3.4 Specification of econometric models

Two econometric models are adopted to analyse the data. These are the logit regression model and the propensity score matching (PSM) models. The logit model is used to identify and analyse the factors that determine household participation in the SMCP. The PSM is applied to estimate the average treatment effect on the treated group (ATT) compared to the comparison group.

4.3.4.1 The logit model

Binary choice models assume that individuals are faced with a choice between two alternatives and that the choice depends on certain identifiable characteristics. This means that one can predict which of the two alternatives an individual or household is likely to belong to given certain observed information (Field, 2009: 265). In binary choice models, it

is implicitly assumed that the dependent or response variable Y is dichotomous in nature, taking a 1 or 0 values. A unique feature of such a model is that it elicits a yes or no response. The commonly used approaches used to estimates such models include the Linear Probability Model as well as the Logit and Probit models. Vasisht (2012) argues that the Linear Probability Models such as OLS has certain problems such as the non-normality and heteroscedastic variance of the error term and the fact that the predicted probability of the dependent variable could lie outside the 0-1 range makes it a logically less attractive model.

In the literature, the logit and probit models are two binary choice models commonly used in analysing households' participation in credit programmes (Li, Gan, and Hu, 2011:238). Both models provide consistent, efficient, and asymptotically normal estimates, and yield very similar prediction results in an empirical work and assume that the error term (ε_i) is normally and logitally distributed. This study utilises the observed information of a household's decision to participate in SMCP and remain established client. Household's decision to participate in the SMCP and remain an established client is hypothesised to be determined by a combination of factors including household demographics and socio-economic factors, SMCP loan programme characteristics as well as village related factors as presented in Table 4.3. Therefore, variables at the household, programme and village levels were used to estimate the probability of the client household's decision to participate in the programme using the logit model owing to the merits such as good approximation and analytical convenience (Ben-Akiva and Lerman, 1985; Train, 2003 cited in Li, *et al*., 2011: 238). The logit model is a maximum likelihood estimator that allows for estimating the probability that an event occurs or not by predicting a binary dependent outcome from a set of observable independent or predictor variables.

Let us consider a linear regression of the form;

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + ... + \beta_n X_{ni} + \varepsilon_i \text{ ---------1}a$$

Y_i= the outcome variable predicted from the equation
X_i= a vector of explanatory variables representing household, programme and village related factors as listed in Table 4.3.1
β 's = a vector of regression coefficients to be estimated
εi = the error term

In linear models as expressed in equation 1a, the predicted probabilities of the dependent variable may lie outside 0-1 probability values, if X_i value are not bounded and restrictions are not applied on the β's (Verbeek, 2004; Green, 2003). Furthermore, Vebreek and Green argue that linear models have highly non-linear distributions and suffer from heteroskedasticity. They also imply that the variance of the error term is not constant.

To overcome the problems observed with linear models, binary choice models such as the logit model was used to produce predictions consistent with underlying probability theory. In logit regression, instead of directly predicting the value of the binary outcome variable (Y) from the explanatory variables (X's), we predict the probability of Y occurring given some observed values of the explanatory variables. Thus equation 2a and 3a shows a binary choice model which represents the estimation of the probability of participation in the SMCP (Y) as a function of independent variables (X). The probability estimation of the dependent variable as applied by Green (2003) can be represented by;

$$\Pr ob(Y_i = 1) = F(\beta' X_i) \text{ ----------2}a$$
$$\Pr ob(Y_i = 0) = 1 - F(\beta' X_i) \text{ ----------3}a$$

Where

$$Y_i = \begin{cases} 1 \; if - household \; is \; participant \; of \; SMCP \\ 0 \; if - household \; is \; notparticipant \; of \; SMCP \end{cases} \text{ ------4}a$$

The probability model involves regression of the conditional expectation of Y on X as given by:

$$E(Y / X) = 1[F(\beta' X)] + 0[1 - F(\beta' X)] = F(\beta' X) \text{ ------5}a$$

The F-function represents that the logit model uses a logit cumulative distributive function. When an outcome variable is dichotomous or binary, the relationship between variables may be nonlinear and can be converted into linear ones through logarithmic transformation. Therefore, the logit regression equation from which the probability of the outcome variable (Y) is predicted is given by:

$$P(Y=1 \mid X) = \frac{e^{\beta' X}}{1+e^{B' X}} \text{ ---------- } 6a$$

$$P(Y=0 \mid X) = 1 - \frac{e^{\beta' X}}{1+e^{\beta' X}} = \frac{1}{1+e^{\beta' X}} \text{ ---------- } 7a$$

Where:

P(Y)= the probability of Y occurring as defined in equation 4a
e = the base of natural logarithms

The logit regression in equation 6a and 7a is expressed in logarithm terms and overcomes the problem of nonlinearity. The result of the logit regression varies between 0 and 1: values closer to 0 indicates that the outcome variable (Y) is unlikely to have occurred and values closer to 1 indicate the probability of Y occurring is very high.

The output of the logit regression model explains the probability that the outcome variable (Y) changes when of the independent variables change. Thus a positive logit coefficient tells us that a change in the independent variable (X) increases the probability that (Y=1). A significant coefficient indicates that the positive effect is statistically significant. But the logit coefficient does not tell us by how much percentage will the probability of (Y=1) change when the explanatory variable (X) changes by one unit. The logit coefficient shows the direction of the change not the magnitude of the change. The magnitude of the effect would be estimated by calculating the marginal effects.

The marginal effect of a unit change of the X covariates on the dependent variable (Y) as applied by Green (2003) can be computed by taking the derivative of the cumulative standard logit distribution:

$$\frac{\partial E[Y_i \mid X_i]}{\partial X_i} = F(\beta' X)[1 - F(\beta' X)]\beta \text{ ---------- } 8a$$

It indicates by how much percent the probability of (Y=1) changes when the X covariates change by one unit. STATA software version 12.0 has an inbuilt system to compute the coefficients of the logit function, and the marginal effects. Accordingly, based on empirical and theoretical literature, the following observable explanatory variable as shown in Table

4.3 have been selected which are expected to likely affect the household's participation in the SMCP in rural Eritrea.

Table 4.3: List of independent explanatory variables used in logit model

Variable Category	Variable name (X-covariates)	Variable type	Variable description	Expected sign
Household socio-economic and demographic characteristics	Age	Continuous	Age of client hh* (in years)	+
	Gender	Binary	Gender of client hh*(1= male, 0= male	+/-
	Household size	Continuous	Household size (in numbers)	+
	Marital status	Binary	Marital status of client hh* (1= married, 0=otherwise	+/-
	Educational qualification	Continuous	Education of client hh* (in years)	+
	Entrepreneurial experience	Continuous	Entrepreneurial experience (in years)	+
	Land ownership	Binary	Land ownership (1= yes, 2=no)	+
	Land size	Continuous	Land size (in hectares)	+
	Ownership of irrigated land	Binary	Ownership of irrigated land (1= yes, 2=no)	+
	Livestock ownership	Binary	Livestock ownership (1= yes, 2= no)	+
	Permanent employment	Binary	Employed permanently (1=yes, 2=no)	+/-
	Temporary employment	Binary	Employed temporarily (1=yes, 2=no)	+/-
	Receipt of remittance	Binary	Receipt of remittance income (1=yes, 2=no)	+/-
	Occurrence of negative events	Binary	Occurrence of negative event to hh (1=yes, 2=no)	+
	Microenterprise ownership	Binary	Ownership of microenterprise (1=yes, 2=no)	+
Programme characteristics	Loan size (1st round)	Continuous	Amount of first loan (in Nakfa)	+
	Loan type	Categorical	Type of loan (1= group loan, 2= individual loan)	+/ -
	Perception of mandatory deposits	Categorical	Evaluation about the value of mandatory deposit (1=high, 2=low	–
Infrastructure Characteristics	Village access to electricity	Binary	Village access to electricity (1= yes, 2=no)	+
	Village access to roads	Binary	Village access to roads (1 = yes, 2=no)	+

Note: *hh- Household

4.3.4.1.1 Description of explanatory variables

Age: the age of the client household is an important demographic factor that potentially affects productivity, income and thus consumption. The life-cycle hypothesis postulates that the young are more likely to participate or borrow from microfinance institutions because of their ambition to invest and accumulate wealth during their working age. The old on the other hand are less likely to participate in saving or borrowing activities. The old are more likely to depend on past saving and accumulated wealth for their consumption (Mpuga, 2008; Zeller, 1994). Younger households particularly in their middle age tend to engage in different productive activities to increase their income and saving and gradually accumulate wealth to ensure higher future consumption and therefore their willingness for borrowing increases. In the context of microcredit, (Fakayode and Rahji, 2009) argue that age can be used as a proxy to measure the level of maturity in using loans more judiciously and shows the repayment capability of the borrower. This indicates that as client households get older, they accumulate experience, master the rules of the game, build confidence and thus increase their probability of borrowing. Therefore, based on these arguments, age of the client households is hypothesised to have a positive relationship with their participation in microfinance.

Gender: in societies where tradition plays a dominant role in the allocation of various tasks, gender has also implications in the demand for microcredit. In the rural context of Africa, where men dominates women, there exists gender biased economic activities. Ilahi (2001) argues that women mostly engage in farm and household activities while men engage in income generating activities. This gender biased role has its own implications on the decision to participate in microcredit. Custom and tradition also exert differential power relations between men and women which further suppress asset ownership by women. Therefore, in the past women were in a disadvantaged position with regard to pursuing an independent entrepreneurial and economic opportunities and thus denied access to credit facilities. As a consequence Nwaru (2011) hypothesised that the probability of borrowing from financial institutions is negatively related with women clients and positively related with men. However, since the recent past, microfinance institution and other international agencies have

been stepping up their efforts to encourage women to become beneficiaries of microfinance services and as a result women's membership in these institutions has increased substantially. From such perspective, the effect of gender on the decision to participate in microcredit is indeterminate or ambiguous depending on contextual factors governing gender issues.

Household size: a household with more members is expected to be exposed to consumption shocks and needs additional resources to stabilise their consumption. Chivakul and Chen (2008) noted that larger family are more likely to borrow compared to smaller ones as they are more likely to have a higher dependency ratio. This is because large household size with the probability of having more dependents such children and elderly members are likely to consume more of their income which otherwise could have been partly saved and invested in income-generating activities. Similarly, Martey, Etwire, Wiredu, and Dogbe (2014), claim that household expenditure on food and other consumption items increase with household size. On the other hand, higher consumption due to large household size reduces the probability of wealth or asset accumulation which further compromises future consumption and repayment capacity (Tang, Guan, and Jin, 2010). Therefore, larger household size would mean that more resource constraints and more likely to borrow from microfinance institutions to fill the gap. On the bases of the above arguments, household size is hypothesised to have a positive relationship with the demand for microcredit.

Marital status: Nnadie and Akwiw (2008) argue that married couples are expected to be more concerned about household welfare and food security and the need to maintain a minimum consumption threshold would lead them to decide in favour of participating in microfinance programmes. Similarily, married couple are expected to form a family Moreover, married couples are less mobile and the joint cosigning and responsibility between them could increase the probability of accessing credit. On the other hand, unmarried clients such as divorced, widowed and singles may also borrow to maintain a certain level of consumption and participate in income generating activities. Female headed households are less privileged in terms of asset ownership such as land and more likely to be vulnerable to consumption shocks because of low income earning opportunities and low saving. Due to such facts female headed households are more likely to seek loans and participate in

microfinance programmes. Therefore, the effect of marital status on the decision to participate in microfinance programmes is indeterminate.

Educational qualification: the level of education as measured by the number of years of schooling is hypothesised to have positive effect on the likelihood of borrowing. According to Feder *et al*. (1985), education enables client households to perceive, interpret and respond to new information faster. Awunyo-Vitor, Abankwah, and Kwansah (2012) found that increase in the number of years of schooling had a positive effect on women's participation in microcredit and concluded that education promotes participation in microcredit in general. Fakayode and Rahji (2009) also claim that clients with some level of education are expected to have "better technical knowledge, know-how, farming skills, more information on credit markets and facilities and familiarity with bureaucratic procedures".

Entrepreneurial experience: having some business or entrepreneurial experience is hypothesised to have positively related with the participation in microfinance programmes. Clients who set goals and strive to achieve them, take initiatives and assume risks, and who have basic know-how and skills on marketing, production, distribution, finance etc. are more likely to join microfinance programmes seeking finance either to set up or expand their microenterprises. Fatimah-Salwa, Mohamad-Azahari, and Joni-Tamkin (2013) from their studies in Malaysia confirmed that experienced microcredit clients are more successful than inexperienced ones in terms of handling problems as they occur by applying their previous experience

Land ownership and land size: could be an important determinant of credit demand. In a rural context land could serve as a proxy to measure wealth. Under properly defined property rights and appropriate land registration, land could be used as physical collateral for farm households to participate in microfinance programmes particularly to access individual loan. Kangogo, Lagat and Ithinji (2013) claim that land size represents an important mode of borrowing for farm clients. In situations where land can be collateralized, it could positively affect households' participation in microcredit programmes (Nguyen, 2007). According Fakayode and Rahji (2009), farm size could be used as a proxy to estimate the expected

income of the borrower and thus households with large plots of farm size are expected to more likely demand loans from microfinance programmes. This is due to the fact that small and fragmented landholdings prevents opportunities for large scale agricultural projects, increases transaction costs and thus yields low agricultural productivity and income. On the other hand, in most developing countries owners of land lack property titles and proper land registration is absent. Neither the legal system nor the market mechanism allows land to be bought and sold or exchanged and this effectively diminishes its value as collateral and turns out to be an invisible wealth (Mckechnie, 2005; Besley, 1994). Ownership of irrigated land has also assumed to have positive effect on the probability of borrowing as it is mainly used to produce cash crops. Irrigation requires inputs such water pump, irrigation canals, improved seeds and other expenses which could be covered through borrowing from microfinance programmes. Akudugu (2012) argues that farmers who engage in cash crop production are assumed to be "more entrepreneurial and business oriented and more likely to demand credit to finance their production activities".

Livestock ownership: livestock represents a dominant asset in most rural areas of developing countries. Livestock contributes directly or indirectly to the livelihood of rural households (Jazen and Carter, 2013). Livestock contributes to household food consumption and income generation. Livestock also represents an important instrument of saving in situations where profitable and safe saving opportunities are non-existent. In times of adverse shock such as drought, livestock constitutes a significant copping strategy (Castellani, 2014). Livestock ownership is hypothesised to have positive relationship with the probability of borrowing from microfinance programmes by rural households. Livestock is an asset that can be used as collateral to access loans especially for rural households looking for individual loan. Therefore households who own livestock are more likely to demand individual loan. During adverse weather condition such as drought, it is not only members of the household that face consumption risk but also their animal stock, either because of death due to lack of animal feed (forage), or sale of their stock at a lower price (Lange and Reimers, 2014). Borrowing from microfinance institution therefore, ensures the survival of livestock by enabling owners to purchase forage for their animals avoiding unplanned sale and effectively transferring value to the future when prices stabilise. Furthermore, microfinance entails a copping

strategy to smoothen household food consumption replacing the desperate sale of livestock at lower prices.

The direction of relationships between whether a client household receives income from ***remittances, permanent and temporary employment*** and their participation in microfinance is not clear. For example, for some households' remittances may substitute household's demand for loan thereby negatively affecting participation. On the other hand, regular remittances may constitute additional source of income supplementing client borrowing and enhances accessibility due to its effect on collateral Bendig, Giesbert, and Steiner (2009). The same argument could be applied to explain the ambiguity regarding the direction of relationship between clients' employment status and their participation.

Negative events: a household that has experienced an adverse shock such as unexpected fall in income or consumption either due to illness or death of household member, death of livestock, drought, or social expenditure such as wedding and ceremonies could be more likely to borrow from microfinance institutions (Bending, *et al*., 2009). Zeller and Sharma (2002), argue that "borrowing during adverse shock is an integral part of the livelihood system of households in developing countries". This was further supported by Nguyen, *et al.* (2007) that households that experienced shocks would be willing to borrow either to supplement their dwindling operating capital for their business or reestablish their economic activity hit by the shock. Moreover, the absence of insurance mechanisms and saving facilities in rural areas makes households more vulnerable to covariate and idiosyncratic shocks (Tang, *et al*., 2010). Such shocks thus make households to positively respond to credit availability with the objective of promoting or protecting production, investment and consumption activities.

Mandatory deposit: is a condition where borrowers are required to deposit a certain percentage during loan take up and repayment time as part of the requirement to access loan. It serves dual objectives. Firstly, it teaches clients financial discipline and promotes saving habits, and secondly, it serves as a backup or collateral for the microfinance institution in times of default (CGAP, 2005). Whether mandatory deposit encourages or discourages

households to borrow from microfinance institutions depends on the perceived costs and benefits of such deposits. Adams (1973) argues that farmers perceive mandatory deposits as additional costs to access credit or other services. Interest rate paid on such deposits is less than that charged on loans yielding negative rate of return to client depositors. CGAP (2005) further argues that mandatory deposits cannot be accessed on demand and thus cannot be withdrawn at the depositor's discretion. Mandatory deposits also reduce the real value of the loan particularly if large deposits are required during loan disbursement. In group lending, clients may lose their mandatory deposits in case one or more group members default or could not repay their debt for various reasons. Therefore viewing from such perspective, mandatory deposits have a negative effect on the probability of borrowing from microfinance programmes.

Microenterprise ownership: the traditional argument of the demand for credit implies that the provision of additional financial resources enhances the level of productive capital for microenterprise operations. With this capital, microenterprises will have the opportunity to access the necessary inputs, equipment, raw materials and cover operating expenses. Loans for business purpose for both working and fixed capital are commonly seen as the financial resources microentrepreneurs need most. The availability of credit leads to investment in productive activities that could have the potential to create self-employment and thus improve their livelihood. In most developing countries lack of access to credit by small and micro entrepreneurs constitutes a major constraint for growth and expansion (Otero and Rhyne, 1994). Therefore, households that have already owned microenterprises are hypothesised to have higher probability of borrowing from microfinance programmes.

Loan size: in a competitive credit market where interest rate is determined by demand and supply, the market demand for loan is negatively related with the price of loan. However, in a poorly organized and integrated credit market such as in rural areas of most developing countries, interest rate is mainly fixed. This is also true for most microfinance institutions in rural areas. If the interest rate is fixed, other things remaining equal, households are expected to borrow as much as they want on the fixed interest rate. The interest rate charged by microfinance institutions is higher than that charged by commercial banks but lower than that

charged by moneylenders. As a result, given lack of other alternatives, and the high demand for credit, an increase in the supply of loan size by microfinance institutions is expected to positively affect the probability of borrowing.

Loan type: refers whether the available loan is group-based loan or individual loan. Group lending is by far the most innovative approach introduced by microfinance institutions to reduce the problems of adverse selection and moral hazard observed in formal financial institutions. Group lending through joint liability among group members substitutes social collateral to physical collateral and encourages those households that lack physical collateral to borrow from microfinance institutions (Akudugu, Egyir, and Mensah-Bonsu, 2009). From the demand side, the absence of physical collateral stimulates borrowing indicating positive relationship with households' participation. However, Devereux and Fishe (1993) argue that group lending transfers transaction costs from financial institutions to group members. Transaction costs in this context includes the need to form and select members based on similarity of needs, monitoring client performance, enforcing repayment in case a member defaults and assumes the burden of repayment if a member strategically defaults. Therefore, when the cost of group loan is greater than its benefits, clients might opt for individual lending meaning that the direction of relationship would be negative. Thus, the association becomes ambiguous.

Village access to electricity and roads: infrastructure is a key factor for socio-economic development. Sustainable development can be achieved through sustained infrastructural development. In rural areas, the availability and level of infrastructure significantly affects the level and quality of rural livelihood and development (ECA, 2013). Rural infrastructure promotes access to markets, encourages diversification, increases employment opportunities, reduces costs and thus improves efficiency, promotes intensification and specialization in production, facilitates trade and commerce and permits inclusive development. The accessibility of roads in rural areas determines production and consumption patterns. IFAD (2001) reports that farm households who have access to better roads are more likely to produce for marketing purposes as they will have more frequent and direct contacts with

market centers. Those households with poor market access on the other hand tend to produce more for domestic consumption.

Household borrow from financial institutions to invest in income generating activities among others. The availability of electricity and roads in a village enhances the productivity of financial resources. Therefore, access to such facilities was hypothesised to have positive relationship with the probability of borrowing.

4.3.4.2 The propensity score matching (PSM) model

Authorities in the public policy-making and programme managers are keen to evaluate whether a particular intervention is effective in accomplishing its intended objectives. Microeconometric approaches have become common techniques in estimating and evaluating development oriented projects in different fields. A well-designed intervention is typically based on theory or research evidence that articulates how the intervention's core mechanisms will work to achieve its goals and produce the desired outcomes (Heinrich, Maffioli, and Vazquez, 2010).

Impact assessment of a particular intervention requires the estimation of an outcome that could have been observed for programme beneficiaries had they not participated in the programme. The main challenge in assessing impact is thus the construction or identification of an appropriate counterfactual outcome. A counterfactual refers to a situation where what would participants look like in the absence of the intervention or treatment variable. According Gertler, Martinez, Premand, Rawlings, and Vermeersch (2011) the counterfactual is 'an estimate of what the outcome (Y) would have been for a programme participant in the absence of the programme. The situation whereby a participant would have experienced had he or she not been exposed to the intervention remains the difficult task in measuring the impact of an intervention.

The impact of an intervention could be studied using two approaches namely experimental and nonexperimental or quasi-experimental approaches. The distinction between the two

approaches lies in the choice of methods to identify a comparison or control group, i.e., a group of non-participant in a programme which has as similar characteristics to the treated group as possible. A typical example of an experimental approach is the Randomised Control Trial (RCT) where participants (treated group) and non-participants (control group) are randomly selected before the intervention takes place (Bartik, 2002). In RCT sample selection for assessing impact takes place before the start of the programme. However, for ex post programme evaluation, nonexperimental or quasi-experimental designs are more applicable. For ex post impact assessments, non-participants (control group) have to be selected on the basis of observable characteristics. In nonexperimental or quasi-experimental design, econometric techniques are used to model the participation and outcome processes and arrive at unbiased estimate of programme impact. According Hulme and Arun (2009), in quasi-experimental design a comparison is made between the outcomes of an intervention with a simulation of what would have been, had the intervention not been taken place. Propensity score matching, Difference-in-Difference, and instrumental variables methods are empirical models under nonexperimental/quasi-experimental approach (World Bank, 2011).

In the present study, the researcher adopts nonexperimental approach involving propensity score matching model for the following justifications. Firstly, the study seeks to assess the impact of a programme which has been in operation since 1996. This means that the study is based on an ex post assessment and therefore, nonexperimental approach is more relevant. Secondly, the study lacks baseline data or longitudinal data and thus depends on cross-sectional data for which PSM model is more appropriate. Thirdly, impact assessment requires that the comparison group is matched to the treated group based on the predicted probability of participation given certain observable characteristics and thus PSM model is relevant as it is based on matching of propensity scores between both groups.

The propensity score allows one to design and analyse an observational (non-randomised) study so that it mimics some of the particular characteristics of a randomised control trial (Austin, 2011:399; Gertler *et a*l., 2011). According to Khandker, *et al.,* (2010), with matching methods, one tries to develop a counterfactual or control group that is as similar to the treatment group as possible in terms of observed characteristics. The idea is to find

nonparticipant individuals or households who are observationally similar to participants in terms of characteristics not affected by the programme. Participants are then matched on the basis of this predicted probability, or propensity scores to nonparticipants, and then the average difference in outcomes across the two groups is compared to get the impact of the intervention variable. Therefore, the PSM constructs a statistical comparison group that is based on a model of the predicted probability of participating in the treatment, using observed characteristics. Subjects for which no similarity or comparability is found are dropped because no basis exists for matching. Because of the matching requirement, sample selection of comparison respondents is usually greater than that of treated respondents. The larger the sample of comparison subjects, the better would be the matching outcome (Dehejia and Wahba, 2002; Khandker, *et al.*, 2010),

The PSM model is dependent on the selection of observable characteristics of participants and nonparticipants. The presence of unobservable characteristics that could potentially affect outcome of the treated group is not accounted. This is the disadvantage of matching on the basis of a propensity score and could lead into biased estimates. However, Heckman, Ichimura, and Todd (1998) in their seminal paper concluded that the bias due to unobservable factors is empirically less of a concern and can be eliminated through matching methods. The critical issue as far as the model is concerned is choosing the right mix of pre-treatment observable characteristics. Chemin (2008:469) argues that any variable that is expected to affect both participation and outcome needs to be included and statistically controlled.

The PSM technique has gained popularity in recent years for its potential to remove substantial amount of bias from nonexperimental data. According to Rosenbaum and Rubin (1983), a potential advantage of the model is that through its propensity scores, it summarises the predicted probability of participation of the treated and controlled groups based on observed factors into a single index which then can be used to compute the impact of the treatment variable non-parametrically. Once the propensity scores has been calculated for all households, matching will take place based on the propensity score such that the treated group of households will be matched with those control households that have the closest

propensity scores possible to estimate the counterfactual, avoiding the problem of dimensionality in case there are more covariates (Gertler *et al.,* 2011).

The PSM model involves three steps. Firstly, the predicted probability of participation, i.e., the propensity score is estimated using a standard logit or probit model for each sample household based on observable characteristics. Secondly, a check for balance between the observed characteristics of treated and controlled group is required to evaluate the overlap or common support based on the propensity scores. For the PSM to work, the balancing property needs to be satisfied. The similarity in the propensity scores for each group shows that the observed characteristics between the two groups are similar. However, if there is misspecification of variables that enter into the model, the balancing property fails to hold, and the estimated outcomes would be biased (Khandker, *et al.*, 2010). Thirdly, a matching estimator is selected to estimate the average effects of the programme on outcome of interest is to identify the impact of the programme or intervention variable.

There are two important assumptions that need to be satisfied for the PSM model to correctly estimate the impact of participation in a certain programme. These are the Conditional Independence Assumption and the Common Support Condition (Heinrich, *et al.,* 2010, Gertler *et al*., 2011; Khandker, *et al*., 2010).

i. ***Conditional Independence Assumption (CIA):*** states that assignment to treatment is exclusively based on observed characteristics and potential outcomes are independent of treatment assignment. There are a set of X covariates which are observable to the researcher, such that after controlling for these covariates, the potential outcome is independent of the treatment status. Unobserved covariates play no role in the treatment assignment. Under this assumption, the participants' mean outcome had they not participated can be identified by the mean outcome that belonged to the non-participants who forms the comparison group. This means that the outcomes that belong to the non-treated households would be what treated outcomes would have been had they not been treated (Chemin, 2008:465). The CIA is crucial for correctly identifying the impact of the programme. It accounts the differences between the treated and untreated groups in order to reduce the selection bias. In this case a

counterfactual for the treatment group can be established using the untreated or comparison groups (Duy, 2012).

ii. ***Common Support or Overlap Condition***: - this assumption ensures that households in the treatment and comparison groups are required to be comparable. This assumption requires the existence of a substantial overlap between the propensity scores of treated and untreated groups. Specifically, the common support assumption presupposes that households with the same observable characteristics have a positive probability of being in both the treated and controlled groups (Heckman *et al*., 1999: 1865). In other words, for each treated household, there is a matched control household with similar observable characteristics. This requirement can be imposed such that estimation is performed on households that have common support only. The average treatment effect on the treated (ATT) is therefore given by the difference in mean outcome of matched treated and controlled households that have common support conditional on the propensity scores.

4.3.4.2.1 PSM model specification and definition of variables

Impact evaluation is defined as the estimation of the average effects of a treatment or a programme on the outcome of interest. To properly estimate the impact of a certain programme or treatment, we need to have two groups namely the treatment and the control or comparison group. The group that receives treatment variable is called the treated group and the group that does not receive the treatment is the control or the comparison group. The variable that the treatment is expected to have an effect on is the outcome variable.

The treated group is therefore, the group of interest and the one we want to calculate the effect of the intervention programme. In this study, households who have been beneficiaries of the SMCP for more than three months are considered to be the treated group. Those households who have applied to join the programme and/or being in the programme for less than three months represent the control and comparison households.

In defining the treatment assignment, D is a binary variable that determines if the household has the treatment or not. Therefore,

$$D = \begin{cases} 1 - if \ \ household \ \text{is treated client of SMCP} \\ 0 - if \ \ household \ \text{is nontreated client of SMCP} \end{cases} \} - - - - - - - - - - - - - - 1b$$

The treated clients of SMCP are those households who have been beneficiaries of the programme. Those households who are nontreated represent the comparison group and are expected to form the counterfactual. The estimation of the effects involves a binary response with a logit model for the probability of households to be assigned into the treated and comparison group. The observable characteristics called X covariates determine the likelihood of being assigned into the treated group. X_i's represent a vector of socio-economic, demographic, programme and village variables that determine the probability of the household being assigned to treated and controlled groups as defined in Table 4.3. The propensity scores model is thus a typical probit/logit model with D as the treatment variable and X's as observable independent variables and Y as an outcome variable.

The propensity score model is defined as:

$$P(X) = \Pr(D=1|Xi) = E(D|X_i) - - - - - - - - - - - - - - - - - - 2b$$

The propensity score estimates the conditional (predicted) probability of receiving treatment given pre-treatment characteristics (X_i). Caliendo and Kopeining (2005) define the propensity scores as the probability of participating in a programme given observed characteristics *X*.

Once the propensity score is estimated, matching of households from the treated group and control group is made based on their propensity scores. The goal in the matching process is to find a match for each treated observation with similar characteristics from the controlled observation.

4.3.4.2.2 Empirical treatment estimation strategy

Once we find the best match for each treated household, the next step is to calculate the treatment effect. In doing so a comparison is made on the outcome variable Y between the treated and controlled households after matching.

$$Y = \begin{cases} Yi1 \text{ if } D = 1 \\ Yi0 \text{ if } D = 0 \end{cases} \text{----------} 3b$$

Where Y_{i1} = outcome for the treated group when they receive the treatment
Y_{i0} = outcome for the controlled group when they do not receive the treatment

Treatment effects can be calculated using average treatment effects (ATE) or average treatment effects on the treated (ATT). In ATE the evaluation seeks to estimate the mean impact of the programme, obtained by averaging the impact across all the households in the population. The ATE is more applicable for random experiments. For observational or nonexperimental studies, ATE may produce biased estimates if treated and control observations are not similar. Therefore, the ATT which this study employs measures the impact of the programme on those households who have been beneficiaries of the programme.

The true impact of a programme on a certain participant i, is given by Δi which shows the difference between Y_{i1} and Y_{i0} (Heinrich, *et al.*, 2010; Perry and Maloney, 2007). It is expressed as;

$$\Delta i = Y_{i1} - Y_{i0} \text{----------} 4b$$

However, the challenge in identifying the true impact is that a subject cannot be observed as a participant and nonparticipant at the same time and therefore, the true impact cannot be observed. The unobserved outcome is what constitutes the counterfactual. This indicates that there is a missing component in equation 4b. An approach to fill the missing data is to use a statistical approach to replace them with group average or group statistics that enable us to estimate the impact of the programme (Heckman, 1997). An approach widely used and adopted in this study is the average treatment effect on the treated' (ATT). It measures the outcome of a group of participants had they not been participated in the programme. The ATT requires finding matches for the treated observation. The ATT is computed as the mean impact of the treatment on the treated.

Using ATT, the true impact can be expressed as;

$$\gamma = E(Y_{i1} \mid D_i = 1) - E(Y_{i0} \mid D_i = 1) \text{----------} 5b$$

The true counterfactual outcome is represented by $E(Y_{i0} \mid D_i = 1)$. It represents the outcome of the participants had they not been participated (Dehejia and Wahba, 2002, Heckman, 1997). However, as mentioned above while $E(Y_{i1} \mid D_i = 1)$ can be observed and measured, its counterfactual $E(Y_{i0} \mid D_i = 1)$ is unobserved and cannot be measured directly since a subject cannot be observed in two mutually exclusive settings as participant and nonparticipant at the same time. Therefore, an alternative counterfactual has to be constructed through the formation of control groups that resembles to the observed outcomes of participants or the treatment group. The ATT is then used to estimate the true impact (γ) as follows

$$\gamma^* = E(Y_{i1} \mid D_i = 1) - E(Y_{j0} \mid D_j = 0) \text{----------}6b$$

Where ($i \neq j$), and refer to subjects in the treated and control groups respectively, γ^* is an estimate of γ, Y_{i1} and Y_{j0} represents outcomes for i and j respectively (Sarangi, 2007; Coleman, 2005). Equation 6b states that the difference between the average outcomes between the participants (treatment group) and nonparticipants (control group) can be attributed to the impact of the programme. Y_{i1} -being the outcome for household i conditional on participating in the programme and Y_{j0} represents the outcome if household j did not participate.

According to Abadi (2005a cited in Li, 2010), the estimation of ATT is highly dependent on the assumption that the observed characteristics of the treated and control group are similar. The distribution of the counterfactual outcome of the control group needs to be similar to that of the treated group would have had in the absence of the treatment. Therefore, equation 6b can be rewritten as follows;

$$\begin{aligned}\gamma^* &= E(Y_{i1} \mid D_i = 1) - E(Y_{j0} \mid D_j = 0) \\ &= E(Y_{i1} \mid D_i = 1) - E(Y_{i0} \mid D_i = 1) + \left[E(Y_{i0} \mid D_i = 1) - E(Y_{j0} \mid D_j = 0)\right] \\ &= \gamma + \left[E(Y_{i0} \mid D = 1) - E(Y_{j0} \mid D_j = 0)\right] \text{----------}7b\end{aligned}$$

where $\left[E(Y_{i0} \mid D_i = 1) - E(Y_{j0} \mid D_j = 0)\right]$ represents the selection bias.

Equation 7b indicates that γ and γ^* will be equal if the second term in the bracket is equal to zero which in other words means the selection bias is zero. In the absence of the selection bias, the estimated and true impact of the programme becomes equal. If the selection bias is different from zero, the ATT is a biased estimate. In the PSM model an important condition that enables us to assume that there is no selection bias is the CIA (Caliendo & Kopeinig, 2005). Therefore, in this study, the CIA holds on the condition that selection is exclusively based on observable characteristics and the incorporation of new clients of SMCP whose membership in the programme is less than three months as a comparison group is expected to capture the unobserved characteristic such as entrepreneurial attitude, motivation, etc., so that selection bias is minimised if not completely controlled. The fact that sample households were selected from villages where the SMCP services are widely available is expected to overcome programme placement bias. However, note that since the treatment and control groups cannot be exactly similar in all observed and unobserved factors, the ATT estimate cannot be free of bias.

Finally based on Heckman, *et al.* (1998) and Dehejia and Wahba (2002) the empirical estimation of the treatment effect on the relevant outcome of interest is defined as

$$ATT = \frac{1}{N_1} \sum_{i:D_i=1} \left[Y_{1,i} - \sum_{j:D_j=0} w_{i,j} Y_{0,j} \right] \text{----------8b}$$

Where ATT = the average treatment effect on the treated
- N_1 = the number of treated households in the sample
- i = treated household i
- j = untreated household j
- $D_i=1$ = household receiving the treatment
- $D_j=0$ = household not receiving the treatment
- Y_1 = outcome when the household receives the treatment
- $W_{i,j}$ = weight assigned to each untreated household. The weight depends on the matching method used.

Equation 8b states that each treated household i, is matched with j control household whose outcomes Y_0 are weighted depending on the matching method applied. The outcome Y_1 on the treated household i will have a match on the comparison household j that has an outcome

of Y_0 adjusted with an appropriate weight (w) and summing the difference of the outcomes between both groups and dividing by the number of the treated households in the sample gives the average treatment effect on the treated (ATT) group. According Heckman, *et al*. (1998) for each household i in the treated sample, a weighted average of comparison sample households is formed to estimate the effects of the treatment. The weight attached to the comparison group differs depending on the type of matching estimator applied.

4.3.4.2.3 Types of matching estimators

For each household i, we need to find matches of control household j with similar observable characteristics. Matching can be carried out either with replacement or without replacement. In matching with replacement, each control observation can be used as a match to several treated observations. Matching with replacement is expected to reduce bias of the estimates as it minimises the propensity score distance between the matched comparison group and the treated group though at the expense of a reduced precision. Therefore, in a matching with replacement each treated unit is matched with the nearest comparison unit in terms of a propensity score (Dehejia and Wahba, 2002:153). In matching without replacement, each control observation is used no more than one time as a match for a treated observation (Heinrich, *et al.*, 2011; Caliendo and Kopeinig, 2005). In case there are few comparison units, we may be forced to match treated groups with comparison groups that have even poor similarity in propensity score. This type of matching improves the precision of estimates but at the expense of bias (Dehejia and Wahba, 2002:153). Matching with replacement will be used in this study to improve and check the robustness of results. The most commonly employed matching estimators include nearest neighbor matching, radius matching, kernel matching and stratification (Heinrich *et al*, 2010).

The *nearest neighbour matching* is the most straight forward matching estimator. In a nearest neighbor matching, a household from the comparison group is chosen as a match for a treated household in terms of the closest propensity score or similarity in terms of observed characteristics. Caliendo and Kopeinig (2005) note that the household from the controlled group is chosen as a matching partner for a treated household that is closest in terms of

propensity scores. For each treated household i, a control household j that has the closet scores in terms of the observable characteristics is selected. A propensity score that minimises the distance between the treated and untreated households defines the nearest neighbor matching algorism.

Radius matching imposes a maximum propensity score distance by which a match can be made. The basic idea of radius matching is that it uses not only the nearest neighbor within each caliper, but all of the comparison group members within the caliper. In radius matching each treated household i, is matched with control household j that falls within a specified radius or caliper. The benefit of this algorithm as indicated by Caliendo and Kopeinig (2005) is that it uses as many comparison units as are available within the caliper, avoids bad matches and improves the quality of matches as it imposes the maximum propensity score range.

Kernel matching are nonparametric matching estimators that compare the outcome of each treated household to a weighted average of the outcomes of all the untreated households with the highest weight placed on those with scores close to the treated households. Caliendo and Kopeinig (2005) argue that Kernel matching uses weighted average of all households in a comparison group to construct the counterfactual outcome. The assignment of weights depends on the distance between each household from the comparison group and treated households for which the counterfactual is estimated. Therefore, more weight is assigned to comparison households whose propensity score is closer to that of the treated group. Each household from the treated group is thus matched with several control households with weights inversely proportional to the distance between treated and control household.

Finally, *stratification on the propensity* score involves stratifying subjects into mutually exclusive subsets based on their estimated propensity score. Subjects are stratified into subsets or blocks and ranked according to their estimated propensity score. A common approach is to divide subjects into five equal-size groups or blocks using the quintiles of the estimated propensity score (Austin, 2011:407).

4.4 ETHICAL CONSIDERATIONS

An utmost precaution was made to ensure that the study adheres and fully respects the highest possible ethical standards. The study endeavoured to maintain the integrity of the data collected and the subjects participated. The researcher assumed the primary responsibility to avoid fabrication, falsification, omission and misinterpretation of data that distorts the research outcome. To this effect, clear and complete record of data acquired as well as proper referencing of ideas and data sources was made to preserve accurate documentation of observed facts. As the analysis of livelihoods requires information on assets, expenditures, endowments, and strategies pursued by households, ethics was given due consideration in this respect. Thus, participants were informed about the purpose of the study and were assured that their identity would be kept confidential and not publicly released in any research report or publication so as to safeguard their welfare and safety – a promise that was strictly observed. They were also clearly informed that they had a full personal right to refuse to be interviewed or to withdraw at any point during an interview, and even to request for the deletion of their recordings without incurring any negative consequences whatsoever. Moreover, each one of them was requested to sign an informed consent form, a copy of which has been attached in (see appendix II)

4.5 CONCLUSION

The chapter presents the conceptual framework and methodology adopted in this study. Two conceptual frameworks namely the HEPM and SLA were adopted to conceptualize and corroborate the findings obtained from the data analysis. Both approaches are relevant as they emphasise on the household as a basic unit and an organizing framework to explain and analyse the decision making process in production, consumption, resource mobilisation and allocation activities. Physical, financial, human, social and natural resources are assumed to be at the disposal of the household from which a combination of strategies and activities are pursued to achieve livelihood objectives expressed in the form of increased well-being, reduced vulnerability, improved food security, higher consumption and saving, etc. Both approaches also recognise the role of the contextual environment which includes

organisations, policies, institutions, and cultural norms in influencing and shaping the livelihood strategies and activities carried out by households.

The methodology section of the chapter explains the sampling procedure, data sources and data collection instruments, and econometric models adopted to analyse the data. A mix of cluster and probability sampling frames were applied at regional, branch and village levels. Cross-sectional data were collected through structured questionnaire and semi-structured questionnaire on a set of household socio-demographic, programme and village related variables. Descriptive and econometric models were applied as methods of analysis.

Logit regression model was specified and variables were defined and described to determine the factors that affect participation in the SMCP with their hypothesised sign expected. The logit regression model was applied to achieve two objectives, Firstly, it served to determine the factors that affect the probability of household participation in the SMCP in rural Eritrea. Secondly, the statistical control of these observed variables is expected to produce unbiased estimates of the impact of the treatment variable on the outcomes of interest implying that impact is solely due to the treatment variable.

One among the objectives of the study is to estimate and assess the impact of the SMCP in the livelihood of households in rural Eritrea. Nonexperimental approach involving propensity score matching model was applied as an empirical estimation strategy to estimate the impact of the treatment variable on the relevant outcome of interest. The model involves the estimation of the propensity score and matching of treatment and comparison groups on the basis of their propensity score that falls within a certain common support region. A variety of matching methods were used to check the robustness of the results. The propensity score matching model is believed to be more appropriate for a cross-sectional data and reduces bias through its rigorous econometric application. It also avoids the curse of dimensionality in the case of large observed covariates and large sample subjects.

CHAPTER 5

RESULTS AND DISCUSSION

5.1 INTRODUCTION

This Chapter presents the results on the characteristics of rural livelihoods, determinants of household participation in the SMCP and empirical assessment on the impact of the SMCP on livelihood outcome indicators. The livelihood outcome indicators used to measure household livelihood include profit from microenterprises, value of household assets, value of livestock assets, food consumption expenditure, non-food consumption expenditure, and household voluntary savings. Estimation involves various stages such that each stage contributes to the major objective of the study i.e. assessing the impact of participation in the SMCP on household livelihoods. Data were collected through structured and semi-structured questionnaire on 500 household of whom 200 comprise treated and 300 represent comparison households. The Chapter has four major sections.

The first section describes the socio-demographic characteristics of respondents using descriptive statistics. Based on the concepts drawn from the conceptual framework, the section describes the livelihood assets or capitals owned, the strategies pursued by rural households, as well as the livelihood outcomes generated from such assets and strategies using descriptive statistical tools. The second component of the chapter involves econometric application, mainly logit regression and propensity score matching models. The logit regression model was used to identify the factors that determine household participation in the SMCP (see sub section 5.3.1). Impact was assessed using the PSM model and the average treatment effect due to participation in the SMCP on the treated household group was estimated on annual profits, value of livestock, value of household assets, food consumption expenditure, non-food consumption expenditures, as well as savings (see sub section 5.3.2). Finally a section on conclusion on the main findings and implications of the Chapter are presented.

5.2 DESCRIPTIVE STATISTICS

The section reports and discusses basic information about the socio-demographic characteristics of respondents using descriptive statistics. The section also describes the livelihood features of respondents in terms of the assets they own, the strategies they pursue, and the outcomes achieved and compares the outcomes of treated and control groups using with the relevant statistical tests such as (t-test).

5.2.1 Socio-demographic characteristics of respondents

The results of the descriptive statistics relied on the use of survey data collected from January to May 2014 from randomly selected established or continuing clients of the SMCP and clients newly joined the programme. A total of 500 respondents were surveyed in the study areas. Of these 200 respondents were established or continuing clients who have been beneficiaries of the SMCP services for more than three months and represent the treated group whereas the rest 300 respondents were new clients whose membership in the programme ranged from 0-3 months and were classified as the control or comparison group. The new clients represent those who were applying for the first time to join the programme and/or waiting approval of their application.

Table 5.1 shows the profile of the respondents in terms of the socio-demographic factors and evaluates the values using statistical tests such as the t-test, Chi-squared test and standard deviation. The t-test measures whether the mean difference between the values of the treated and controlled groups is significant or not. The Chi-squared measures whether there exists an association between the treatment variable (participating in the SMCP) and the binary household characteristics. The values in the parentheses indicate standard deviation.

Table 5.1: Descriptive characteristics

Variables	Controlled Group (n=300)	Treated Group (n=200)	Total Sample (n=500)	Statistical test
Age (mean)	45.0 (13.92)	49.0 (13.85)	46.9 (14.02)	t=-3.258***
Household size (mean)	5.7 (2.33)	6.6 (2.60)	6.0 (2.47)	t=-3.949***
Gender (%)				
Male	41.67	51.0	45.4	χ^2 = 4.217**
Female	58.33	49.0	54.6	
Education in years (mean)	3.4 (3.45)	3.3 (3.08)	3.4 (3.31)	t= 0.457
Educational category (%)				
No schooling	36.0	31.5	34.2	
Primary level	36.3	44.5	39.6	χ^2 = 8.808**
Junior level	11.3	15.0	12.8	
Secondary level	16.3	9.0	13.4	
Marital status (%)				
Married	84.7	82.0	83.6	χ^2=0.622
Single/divorced/ widowed	15.3	18.0	16.4	
Own land (%)				
yes	84.0	87.0	85.2	χ^2= 0.857
no	16.0	13.0	14.8	
Land size category (%)				
0	15.7	14.0	15.0	χ^2= 7.211**
1-3	80.3	76.0	78.6	
4-10	4.0	10	6.4	
Land size (mean)	1.4 (1.04)	1.8 (1.39)	1.6 (1.20)	t= -2.805***
Own irrigated land (%)				
yes	5.3	7.5	6.2	χ^2= 0.969
no	94.7	92.5	93.8	
Own livestock				
yes	80.7	77.5	79.4	χ^2= 0.736
no	19.3	22.5	20.6	
Own microenterprises (%)				
yes	63.3	82.0	70.8	χ^2= 20.226***
no	36.7	18.0	29.2	
Source of supplementary income (%)				
Permanent employment	5.7	11.0	7.8	χ^2= 4.746**
Casual employment	27.0	15.0	22.4	χ^2= 9.130***
Remittance	8.7	6.0	7.6	χ^2= 1.215

Source: Field survey, 2014; * Significant at 10%; ** significant at 5%; *** significant at 1%

5.2.1.1 Gender, household size and marital status of respondents

The gender composition of the respondents shows that females dominate the client base of the SMCP (54.6 percent) which is a common observation in most microfinance institutions. Since the sampling procedure categorically followed a random selection principle on a complete gender-blind basis, the outcome shows that more females were captured vis-à-vis male counterparts. Gender has statistically significant association with participation in the SMCP (treatment variable) using Chai-squared at 10 percent confidence level ($\chi^2 = 4.217$). Though access to microfinance services is open for both genders, the SMCP encourages female applicants more than male ones. Not only in this study but also the general membership profile of SMCP shows that 52.2 percent of the members are female clients.

Regarding marital status, the majority of the survey respondents (84 percent) were married at the time of this survey and the others (16 percent) were either widowed, divorced or single. Marital status was found to have no association ($\chi^2=0.622$) with the treatment variable as measured by the Chi-squared. The average household size for the sample respondents is six persons. For the new clients (control group) and established clients (treated group), the average family size is about 5.7 and 6.6 respectively. The mean difference in household size between the two groups was highly statistically significant (t=-3.9492) at one percent significance level.

5.2.1.2 Age distribution of respondents

The ages of respondents were captured as actual distinct values. However it was grouped in the analysis to allow for concise understanding and presentation. The minimum and maximum ages as identified from the result are 18 and 99 while the mean age is 47 years. Mean age of the treated group is higher than that of the controlled group and the difference was highly statistically significant at one percent significance level (t=-3.258). In addition, general observation shows that about 55 percent of the total respondents were between age 25 and 49 years. This implies that most of the clients are in their prime age of life which falls in the economic productive age group. Moreover a significant proportion of the respondents (about 32 percent) belong to the age group of 50 years and above. The proportion in age

group 40-44 years is 14.20 percent and accounts the highest proportion out of all other age groups.

5.2.1.3 Educational attainment of respondents

In order to assess the influence of education on participation into microfinance, respondents were asked to state their highest educational attainment. The result shown in Table 5.1 indicates that more than one-third of the total sample (39 percent) attained primary level of education. Significant proportion of the sample respondents (34 percent) reported that, they had not attained any level of schooling and those attained senior and junior secondary education represent around a quarter of the sample respondents.

Further decomposition of the data by control and treated groups as shown in Table 5.1 shows that the treated group outweighs the control group in all levels of educational qualification except in the senior secondary level where the control group has relatively higher percentage of senior secondary school than the treatment group. The treated group has fewer households who cannot read and write compared to the control group (31 percent and 36 percent) respectively. In both the primary and junior level, the treated group has higher percentage score than the control group.

The mean level of education for the whole sample is 3.4 years of schooling. A look by type of clients shows that the mean level of education for the control group was 3.4 the treatment group was 3.3 and checking the mean difference using the two sample t-test shows that there is no significant difference in the mean level of education between the two groups (t= 0.457).

5.2.2 Livelihood activities and strategies of respondents

Agriculture remains the dominant sector in terms of its contribution to livelihood, income and employment in the majority of the developing countries. Households in rural areas obtain more than half of their income from farming. In the absence of non-farm income generating activities, agriculture remains the primary occupation for most households (IFAD, 2001).

Like any developing country, the Eritrean economy is dependent on agriculture. The sector constitutes the livelihood for the vast majority of the Eritrean people. Given the fact that the study has taken place in rural areas of Eritrea, about 85 percent of the respondents depend on agriculture for their livelihood, employment, income generation and food production and consumption. Land is an important asset that determines the social and economic status of households in rural Eritrea. In Table 5.1, sample respondents own on average about 1.6 hectares of agricultural land. While the maximum agricultural landholding extends up to 10 hectares, the minimum landholding was found to be zero. Most respondents said they owned and operated agricultural land, only 15 percent of them are landless. This means that household with no land might work for wage employment with those who have land or engage in sharecropping arrangement with owners of land. Close to three-fourth of the respondents own between one and two hectares of land. Twelve percent own land size between 3 to 10 hectares. This shows that most household respondents appear to be engaged in subsistence farming with land distribution skewed between one and three hectares per household as shown in Table (5.1).

Ownership of farmland by clients of SMCP shows that those treated clients own on average 1.8 hectares of land relative to the control clients which is an average of 1.4 hectares. Checking the significance of the mean difference of landholdings between treatment and control groups using t-test shows that it was found to be highly statistically significant at one percent significance level (t=2.805). Agriculture in Eritrea is mostly subsistence and purely dependent on rainfall. Although the government is making efforts to transform the agricultural sector by building dams and catchment areas, the use of irrigation is substantially low. Only about six percent of the respondents engage in irrigated agriculture.

Crop and livestock production are the major agricultural practices in the study area. Nearly 87 percent of the respondents reported that they involve in either crop production, livestock husbandry, or both. The objective of crop cultivation is mainly for home consumption with negligible amount of output devoted for marketing. The main cereal crops produced include sorghum, taff, barley, wheat, maize, beans and millet. In aggregate terms, out of the total

produce during the cropping season of 2013, only 15 percent of the total output was sold to the market and 76 percent was used for home consumption and about 8 percent was given to relatives and friends. [4]

During bad harvest households in the study area prioritize food security by devoting considerable amount of their produce for home consumption and siphon off any changes in the price of cereals without adversely affecting the food consumption requirement of the household. Note, however that, with an increase in yield, farm households in rural areas are expected to market cereal output over and above food consumption requirement for the purpose of meeting their cash demands. Vegetable and fruit production was not widely practiced mainly due to lack of irrigation and other input requirement which are not commonly available in the study areas.

The insignificant difference in average yield harvest between the two groups reveals that, during drought, it is the amount of rainfall rather than land size predominantly determines yield harvest in rural Eritrea. Therefore, the occurrence of insufficient and untimely rainfall in 2013 along with inadequate input supplies such as improved seeds, fertilizer, insecticide, and the predominant application of traditional farming practices and technology was responsible for the low and insignificant average yield harvest between the control and treated clients of SMCP. This shows that in the absence of complementary inputs and high dependence on rainfall, the contribution of microfinance to increase agricultural output becomes insignificant.

Livestock[5] husbandry is a common practice in rural Eritrea that takes place along with crop cultivation. Thus during the survey period 79 percent of the respondents reported they owned

[4] In terms of average production for the cereal crops during the cropping season of 2013, the data show that although the treatment group on average produce more relative to the control group, the mean production difference between both groups was found to be statistically insignificant.

[5] Livestock commonly owned by rural households include donkey, ox, cow, sheep, goat, poultry, camel. Donkey and ox are owned by the majority of the respondents.

at least one livestock. Respondents keep a variety of livestock types not only to meet the household's consumption requirement by directly providing livestock products (milk, eggs, meat, wool, transportation) but also to generate sales income that helps purchase other consumption goods and services. The quantity and type of livestock can also determine the borrowing capacity particularly for individual loan clients in the case of the SMCP in Eritrea. This effectively means that livestock can be used as collateral for borrowing from SMCP.

Disaggregating the data by client group shows that the treatment clients owns on average more livestock relative to the control clients as shown in Table 5.2. The mean difference of livestock ownership between the treatment and control clients was found to be statistically significant.

Table 5.2: Average livestock size by client group

HH status	**Cow**	**Ox**	**Sheep**	**Goat**	**Donkey**	**Camel**	**Chicken**
Control group	2.1	0.7	3.9	3.1	0.04	0.1	1.9
Treated group	3.5	0.7	6.5	6.8	1.1	0.3	3.3
t-statistic	-2.4**	-0.62	-2.64***	-3.81***	-1.95*	-2.50**	-2.49**

Source: Field survey data, 2014; ***** Significant at 10%; ****** significant at 5%; ******* significant at 1%

In terms of average livestock size, ownership of goats ranks top among the treatment group (6.77 units) followed by sheep (6.53 units) and for the control group ownership of sheep ranks top (3.94 units) followed by goats (3.06 units). In a subsistence economy predominantly dependent on agriculture, rural households depend on small ruminants to support livelihood. Small ruminants such as sheep and goats are generally owned by the poorer sections of the community (Oluwatayo and Oluwatayo, 2012). The treated and comparison samples own more of goats and sheep relative to other large animals. The preference of goats and sheep over other livestock types such as cows could be because of the relative advantage of small animals in the livelihood of rural households. Several reasons could be mentioned. Firstly, the initial capital required to raise goats and sheep is relatively small as compared to large animals. Secondly, small farmers can start with a few head of goats or sheep and gradually increase the numbers through reproduction and purchase.

Thirdly, the equipment needed for feeding, milking and care also requires only minor expenditure.

The fact that small ruminants have short gestation period, rapid growth, good marketability and generate continuous income make them more preferred by small holder farmers (Adams, Ohene-Yankyera, 2014). Timon and Hanrahan (1986) observe that the feed required for small ruminants can be obtained at a relatively low cost. Therefore, their small size, multiple functions together with early maturity, makes them suitable for meeting subsistence needs of rural households for food and income. Oluwatayo and Oluwatayo, (2012) for example claim that, the income share of small ruminants tends to be inversely related to the size of land holding suggesting that landless households are more likely to own small ruminants. Moreover, in the absence of banking facilities in rural areas the purchase of goats and sheep could be a convenient means of storing cash for future needs.

Livestock assets in rural areas are acquired through a variety of means including inheritance, dowry, gifts from relatives, purchase from own funds, borrowing from relatives and the SMCP. The SMCP applies a progressive lending mechanism whereby clients access larger amounts of funds progressively on the bases of their repayment performance. Therefore, clients at their early stage of SMCP membership can only access small amounts of funds which could be used among others on the purchase of small ruminants such as goats and sheep. With the progressive growth of the funds, clients might add more livestock and other assets. Therefore, as clients access more and more amount of funds, they tend to acquire livestock assets that require greater amount of capital investment. Thus, it is more likely that the new clients (control group) start with livestock assets that require low initial capital investment at their initial SMCP tenure and those who have been in the programme for quite a long time (treated clients) acquire an increased number of goats and sheep and gradually proceed to owning large animals during their tenure in the SMCP.

5.2.3 Ownership and distribution of household assets

Household assets represent vital resources for livelihood improvements. Assets are important not only to maintain the day-to-day consumption needs of the household but also represent security in times of economic shocks, opportunities in times of economic expansion, improve household stability by way of smoothing consumption, and serve as collateral for accessing loans. The poor in rural areas hardly speak of income but the accumulation of assets. Assets can therefore help the poor to meet their present and future needs, enhance their wealth and reduce their exposure to external risks and shocks. In the absence of convenient financial services in rural areas, households keep their wealth in the form of durable and semi-durable assets. The provision of microfinance services plays an indispensable role in enabling rural households' access, manage and build assets for the present and future consumption.

Following the above perspectives, the study attempts to explore the ownership and distribution of physical productive and household items in the study area. Productive assets include those that can directly or indirectly be used to facilitate production activities in farm and off-farm activities, as well as promote transportation, and communication services to rural households. Household items or appliances represent assets that can be used to maintain the day-to-day household activities including the need to meet information and entertainment requirement of the household. Household items include bed, kettle, washing bowel, chair and bucket and are owned by almost all the sample respondents.

Ownership of consumer durables indicates the livelihood status and may serve as a proxy indicator of relative household wealth. These include mobile telephone, television, cabinet, cupboard, satellite receiver DVD, and Sofa are relatively expensive and are not commonly owned by an average rural resident. As far as ownership of productive assets is concerned, sickle, plough and hoe are farm implements commonly owned by the majority of the respondents. Households in rural areas who engage in agricultural activities are expected to own these agricultural implements.

Although livestock and household assets are admittedly not as liquid as cash savings, they can conveniently be converted into cash than assets such as land and housing. In rural

Eritrea, land is owned by the government and citizens have only the user right over land. Moreover, users have no legal land titles that allow them to use land as collateral or exchange it with other assets. Therefore, land is neither bought nor sold. In this case, the accumulation of livestock and other household assets represent a convenient means of storing value in rural Eritrea.

5.2.4 Dwelling conditions and social service facilities

Dwelling conditions and access to the supply of essential social services such as water, electricity, transportation as well as basic health and education services determines the living conditions and livelihood of people living in rural areas. Housing structure and the number of rooms can serve as an indicator of living conditions. Geographic location influences the type and structure of housing owned by households. The housing structure in a cold and temperate climate is more likely to be different from that of hot and arid climate.

The dwelling structure in the survey was classified into three types: modern house made of cement, tin or tailed roof, semi-modern made of cement block, brick, zinc without tailed roof, and traditional house made of wood, mud, thatching. The majority of the respondents (65 percent) indicate that they dwell in a traditional housing structure followed by 32 percent dwelling in a semi-modern housing type and only 2 percent reside in modern housing structure.

Table 5.3: Dwelling type by region

House type	**Gash Barka region**		**Debub region**	
	Frequency	Percent	Frequency	Percent
Modern	-	-	6	11.29
Semi-modern	26	8	136	77.71
Traditional	299	92	28	16

Source: Field survey data, 2014

Table 5.3 shows the dwelling type by region. The data show that there are variations in dwelling type between the two regions. The Gash-Barka region is relatively warm and

therefore, the majority of the dwelling type (92 percent) comprises traditional houses made up of wood, mud and thatching locally called Agudo. In the Debub region where the weather condition is temperate, the dominant dwelling type (77 percent) is semi-modern housing type. On average respondents own 1.9 rooms but decomposing the data show that on average treatment clients own more rooms (2.13) than comparison clients (1.72) and the mean difference using t-test was found to be statistically highly significant. Unlike in urban areas, in rural areas housing as an asset is neither sold nor bought but can be transferred to the family members in the form of inheritance and gifts. Therefore, housing as an asset can neither be used as a buffer in times of shocks and crises and nor be liquidated into cash in cases of emergency needs of the household.

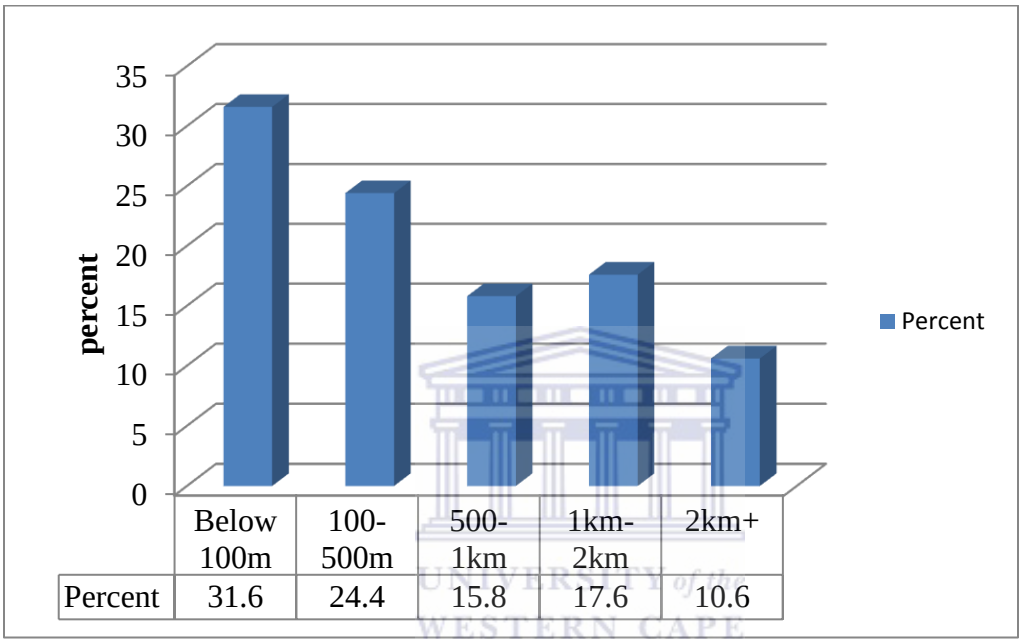
Respondents were asked whether they made any major improvements, repairs or additions to their housing during the past 12 months prior to the survey. Only 37 percent of the total sample reported that they made housing maintenance. However, a greater proportion of the treatment clients (48 percent) indicated housing maintenance compared to 29 percent of the new clients who performed similar task.

The supply and provision of potable water and improved sanitation services is an important means to achieve sustainable livelihood. Water can be classified as an asset which serves both as an input and output to households' livelihoods. The direct consumption of clean water has a direct welfare impact on the household members and significantly affects the livelihood activities and strategies of households as an essential resource.

As shown in Figure 5.1, for 32 percent of the respondents, public tap is their main source of water followed by water tanker/carrier, communal well and borehole pump respectively. Only about 10 percent indicated that their main source of water is from rain water tank, spring and stagnant water. According to the NSO (2013), 36 percent of households in rural areas access water from public tap. Furthermore, more than 50 percent of the respondents report that, they can access their main source of water with in less than 500 meters of distance. Around 70 percent of the respondents access water in a distance of less than one km. This is a clear indicator of the efforts underway by the government of Eritrea to expand

the provision of potable water to rural and urban areas. According to the NSO (2013) access to clean drinking water in Eritrea for rural and urban communities has improved to a total of 57.9 percent of which 49.9 percent is for rural areas and the WHO report 2013, indicate that 77 percent of the rural population have access to potable water.

Figure 5.1: Distance of water source from dwelling



	Below 100m	100-500m	500-1km	1km-2km	2km+
Percent	31.6	24.4	15.8	17.6	10.6

The provision of improved sanitation infrastructure can directly or indirectly contribute to improving livelihoods. Improved and safe sanitation practices leads to better health outcomes which in turn leads to enhanced economic productivity and livelihood improvement. On the other hand, there is vicious cycle between poor sanitation and poverty. According to Borba *et al*. (2007), poor sanitation leads to sickness and disease, which lead to low productivity, and, consequently, to poverty. A good sanitation and hygiene practice has a widely recognised contribution to a healthy environment and healthy society.

Sanitation coverage in Eritrea is relatively low. In the study areas, respondents were asked whether they had toilet facility or not. Only about 39 percent of the respondents reported that they had toilet facility (mainly pit latrine). According NSO (2013), 96 percent of rural households were without toilet facility in 2002.

The expansion of infrastructure in rural areas affects livelihoods in a number of channels. In the study areas about 30 percent of the respondents indicated that they have access to publicly provided electricity. All respondents who have access to electricity use it for lighting purposes. Only 6 percent of the respondents generate electricity from private generators and use it for lighting purpose. Therefore, the use of electricity for productive purpose has not yet promoted to the extent that it facilitates income generation activities. Table 5.14 shows respondents energy use for cooking and lighting

Table 5.4: Respondents energy use for cooking and lighting (percent)

Type of energy	**Cooking (percent)**	**Lighting (percent**
Firewood	99.2	
Charcoal	31.2	
Animal dung	26.8	
Kerosene	9.2	
Solar energy	0.8	2.2
Electricity (public)	0.4	30.6
Electricity (private generator)	0.6	6
Candle		4.8
Torch		73.6

Source: Field survey data, 2014

As shown in Table 5.4, firewood stands the first major source of energy for 99 percent of the respondents followed by charcoal and animal dung dominants sources of energy for cooking. Only 0.8 and 2.2 percent of the respondents indicate they use solar energy for cooking and lighting respectively. Seventy three percent of the respondents report that torch which takes a couple of battery is the major source of lighting for the respondents. Although efforts of the government to electrify rural areas is yet to reach the majority of villages, the substitution of electricity for firewood as a source of energy for cooking remains negligible for various socio-economic reasons among which availability and cost can be mentioned. From environmental sustainability point of view, solar energy has proved to be the most efficient

source of energy. However, the use of solar energy in rural areas of Eritrea at household level remains low mainly due to high cost, lack of installation skills, and low awareness on the benefits of solar energy.

Heavy reliance on firewood along with the traditional dwelling structure that consumes substantial amount of trees is an issue for concern for both environmental and health consequences. Excessive dependence on biomass fuel could result in deforestation and soil erosion as well as its adverse effects on health due to indoor air pollution generated by burning wood, animal dung or agricultural residues (Bruce, *et al.*, 2000). This could in turn in further impoverishment of households who depend upon forest resources would be negatively affected. Therefore, given the current trend in energy use, ensuring environmental sustainability in rural areas remains a challenge in rural Eritrea.

Households operate their livelihood activities and strategies in a certain context. A village in rural Eritrea comprises the basic socio-economic and administrative unit of the rural population. The availability and access to various socio-economic institutions and the provision of basic infrastructure ultimately determines households' capacity to optimally exploit their assets and resource endowments. The provision of clean water, electricity, roads and access to transportation, the availability of basic education and health care services, and marketing opportunities determines the extent to which rural household can convert or enhance their assets and endowments into sustainable livelihood outcomes. In the survey, respondents were asked to state the availability of these services and institutions in their villages.

Table 5.5: Perception of respondents on village infrastructure

Village infrastructure	**Percent**
Availability of clean water	84.2
Availability of electricity	28.2
Availability of clinic/health center	47.8
Availability of elementary school	83.0
Availability of roads	89.8
Access to transportation	73.8

Source: Field survey data, 2014

According the findings in Table 5.5, except for electricity and clinic/health center, more than 70 percent of the households confirmed that their village has access to clean water, elementary school, roads, and access to transportation within a distance deemed acceptable by the village residents. Households in rural areas particularly women unnecessarily travel long distance and waste much time to fetch water, collect firewood, market agricultural produce and facilitate exchange of various types. The availability of roads and access to transportation is thus minimises the time and effort required to move from place to place.

In the study areas, there are markets that are known by the days of the week (Monday market, Tuesday market etc.) whereby market participants are observed in the transaction and exchange of goods such livestock, farm produce, cloths, and other goods from one market to the other. For example buying of one good from one market (Monday market) and selling it in another market (Tuesday market) is a common practice in the study areas. In this endeavor, availability of roads and access to transportation becomes a critical factor for households to maximise their endowments and diversify their income sources as well as make microfinance programmes more effective and productive.

5.2.5 Non-farm microenterprises and diversification of income sources

The participation of households in multiple activities is a characteristic feature of the rural people. Households in rural areas apply various strategies involving staple and cash crop production, livestock husbandry, fishing, forest gathering, trading, wage labour and small nonfarm enterprises either for consumption, accumulation or risk mitigation purposes. Several comparative studies demonstrate that the application and continuous adaptation of a diverse portfolio of activities in order to secure survival is a distinguishing feature of rural livelihood strategies in contemporary poor countries (Ellis, 2000:290). The extent and degree of diversification however differs among household depending on their asset endowments, socio-economic development of the areas where they live, and the contextual and institutional arrangements affecting such activities. A study on rural Ethiopia by Tassesw and Dirribsa (2015:420) indicates that rural livelihood does not depend solely on the agricultural

sector and concluded that livelihood diversification supplements household income and food security. Warren (2002) on the other hand argues that rural livelihood diversification ranges from a temporary change of household livelihood portfolio (occasional diversification) to a deliberate attempt to optimise household capacity to take advantage of ever-changing opportunities and cope with unexpected constraints (strategic diversification).

In the survey areas, respondents were asked whether they owned and operated any one or more microenterprise other than farming in the past 12 months prior to the survey. As shown in Table 5.1, the majority of them (70 percent) reported that they owned or operated microenterprise besides their farming activities. Half of these stated that they involve in animal fattening followed by trading such as small retail shop, hawking which represent 14 percent and services including snacks, teashops, bars and small restaurants, traditional brewing which in aggregate accounted for 9 percent. Only 6 percent of the respondents owned/operated more than one enterprise in the study area.

The findings suggest that farm households in the study areas combine crop cultivation, livestock fattening and other microenterprises as part of their livelihood strategies. This is mainly due to the strong complementarity between crop production and livestock husbandry. First, livestock sales provide important sources of cash for household consumption and investment. In this case livestock provides an investment and accumulation opportunity for the household. Secondly, crop cultivation provides residues for animal feed and livestock provides animal dung which could be used as fertilizer for agricultural land. Thirdly, livestock contributes to household food security in the form of milk, meat and other dairy products. Fourth, available labour during off peak season may be used for livestock herding. Fifth, the fact that there exists high demand and thus higher price for live animals for meat and other dairy products in urban areas in Eritrea may be a motivating force for animal fattening. Further disaggregation of the data by treatment and control group gives the following findings as shown in Table 5.6.

As shown in the table ownership of microenterprises was higher among the treated group (82 percent) compared to the control group (63 percent). This could be due to the fact that, the

treatment clients have been beneficiaries of the SMCP for quite a long period of time relative to the control clients could give them the leverage to identify and practice various types of livelihood diversification alternatives. Those who owned/operated any microenterprise were asked to point out the reasons for doing so. While 58 percent reported that their main motivation was either to get profit, expand income sources or had work experience, 42 percent mentioned more than one reason for their decision to involve in microenterprises.

The contribution of microenterprises towards employment is mainly through the generation of self-employment. Nearly all of the sample respondents (87 percent) claimed that the family is their source of labour. This finding is not surprising given the fact that, in rural areas the family constitutes both as a production and consumption unit. Household resources including labour are major inputs in farm and off-farm activities. In the study areas, only 11 percent of the respondents reported they recruited paid labour to supplement their family labour. The result implies that given the nature of microenterprises in rural areas such as small shops, petty trade, animal fattening, as well as the availability of excess family labour particularly in off-peak season undermines the potential for employment creation other than self-employment. However, the capacity of rural microenterprises to generate additional self-employment opportunities and thus income to improve livelihood should not be overlooked.

5.2.6 Livelihood outcomes of respondents

The livelihood activities and strategies discussed in section 5.2.2 together with the livelihood assets owned by households presented in section 5.2.3 and the social services and facilities available in section 5.2.4 determine the livelihood outcomes achieved. Ownership of land and other agricultural inputs determines the household's capacity to produce food. Ownership of livestock and other household assets affects the relative wealth of the household measured in terms of the value of these assets. Ownership of microenterprises determines the extent of diversification of income sources and amount of profits generated from such off-farm activities. Therefore the livelihood outcomes in this section are essentially derived from what household own and the strategies pursued.

Households combine a variety of livelihood strategies and activities in order to achieve a particular livelihood outcome. From the perspectives of the SLA and HEPM, increase in the level of income, expenditure, and savings, resilience to shocks and stresses, achieving food security and so on are the outcomes of a certain household's livelihood strategies and activities. Livelihood strategies and activities depend on the resources, assets and endowments of households as described above. Resources and endowments open the options available to the household to achieve its objectives and outcomes. Microfinance represents an essential financial resource that offers the household the opportunity to invest in microenterprises or complements household's resilience and adaptive capacity by strengthening their assets and contributing to its consumption-smoothing effort.

Respondents in this study were asked regarding their annual profit from microenterprise activities, their food and non-food expenditures, the values of their durable and livestock assets as well as their saving capacity. Annual profit was calculated based on respondents recall of their annual total sales revenue obtained from microenterprises and total costs incurred to run the microenterprise. Detailed information on household food and non-expenditure was collected to compute expenditures on food and non-food items. Furthermore, the value of cereal crop production used for household food consumption was computed on the basis of current prices to account its contribution to the household's food self-sufficiency. Table 5.6 reports the average values of livelihood outcomes between the control and treated groups.

Table 5.6: Values of livelihood outcome variables by group in Nakfa

Outcome variable	Control group	Treatment group	Mean difference	t-statistic
Average annual profit	19494.78	43723.89	-24229.11	-5.961***
Average monthly food expenditure	3567.103	5214.295	-1647.192	-7.033***
Weighted average food consumption score	41.993	46.782	-4.789167	-5.648***
Average annual nonfood expenditure	14603.02	31785.83	-17182.81	-5.540***
Average asset value	14784.05	20472.99	-5688.94	-2.265**
Average livestock value	55705.7	101702.8	-45997.05	-4.425***
Per capita saving	2021.667	4319.00	-2297.333	-1.7374

Source: Field survey data, 2014; ** significant at 5%; *** significant at 1%
Note: Official exchange rate: 1USD = 15 Nakfa

5.2.6.1 Profit from microenterprises

Profit earned from the operation of microenterprises is the result of livelihood diversification carried out by rural households. It is imperative that rural households involve in microenterprises in an attempt to diversify their income sources, smooth their consumption expenditure, and reduce their exposure to shocks and risks. The main motives of rural diversification in the form of establishing on-farm and off-farm microenterprises as outlined by Warren (2002) among others include the fragmentation of landholding as a result of population growth, the integration of small farmers to the national economy and increased importance of cash transaction in rural household economies, the decline in farm output due to erratic rainfall, the diffusion of transportation and communication facilities and so on. The need to optimally mix household portfolio and take advantage of available opportunities can be considered as a push factors to engage in a variety of microenterprises that generate income for rural households.

Rural households in the study areas were found to participate in a variety of microenterprise forms such as animal fattening and livestock husbandry, petty and small trade, shops and kiosks, teashops, snack bars, small restaurants, etc. Average annual profit earned from such enterprises for the whole sample respondents was found to be 29186 Nakfa. As shown in

Table 5.6, decomposing the data by treatment and control clients proves that average annual profit for the treated clients is higher than the control clients and the mean difference was found to be highly statistically significant at 95 percent confidence interval.

5.2.6.2 Food consumption and spending

Another outcome of interest that affects rural livelihood is expenditure on food. Food is one of the most basic needs for human survival and access to it is a basic human right (Smith and Subandoro, 2007). The ability of households to gain access to sufficient high quality food to enable them to live an active and healthy life is a strategic vision of national and international development efforts. Ensuring food security is one of the core strategic policy issues for the government of Eritrea. Soil and water conservation, the construction of dams and catchment areas, research and dissemination of improved seeds to farmers, afforestation programmes are some of the efforts jointly carried out by the government and the community to improve agricultural productivity and rehabilitate the environment. Likewise, at the household level, ensuring food security remains one of the prime livelihood objectives.

Food can be accessed through own production, or market purchase or both. Respondents were asked to state their food production levels during the cropping season prior to the survey and quantities were converted into monetary values using their current market prices. Moreover, detailed information on monthly expenditure was captured for 17 food items which can be grouped under cereals, pulses, vegetables, fruits, meat, oil, dairy products, sugar and coffee. Therefore, total food expenditure in this thesis implies the sum of the monthly monetary expenditures and values of own production consumed during the month.

Table 5.7: Sources and values of respondents' food consumption

	Treatment Group		**Comparison group**		**Total sample**	
	Value in Nakfa	Percent	Value in Nakfa	Percent	Value in Nakfa	percent
Value of own production	355,019	34	324,915	30	679,934	32.0
Value of market purchase	687,840	66	745,216	70	1,433,056	68.0
Total Expenditure	1,042,859	100	1,070,131	100	2,112,990	100.0

Source: Field Survey, 2014； Note: Official exchange rate 1USD=15 Nakfa

As in Table 5.7, food consumption from own production represents 32 percent for the total sample respondents. The low contribution of agriculture to household food requirement could be attributed mainly to the shortage of rainfall and intermittent drought observed in the study areas. In the absence of sufficient agricultural production, rural households in the study areas depend on the market to access a significant proportion of their food requirements. Given the fact that markets in the rural areas are not developed and well integrated, rural households will more likely to be exposed to substantial supply and price fluctuations which could adversely affects their food security. Looking at the data by treatment and comparison clients shows that the value of own production used for food consumption for the treatment client is marginally higher than the control clients. The results indicate that control clients are relatively more dependent on the market to access their food requirement.

An effort was made to measure food security of the respondents using indicators such as share of household expenditure on food and food consumption score (FCS). The food spending share defines the percentage of expenditure on food relative to the overall household spending basket (Jacobs, 2009:418). According to Smith and Subandoro (2007), the percentage of total expenditure on food shows the relationship between the economic vulnerability of households and their food insecurity. The indicator shows that households that spend more than 75 percent of their budget on food are considered to be very highly vulnerable to food insecurity. Those between 65-75 percent are categorized as high, 50-65 percent is medium, and those whose expenditure on food is less than 50 percent of their total expenditure are expected to have low economic vulnerability.

Detailed information on respondent's food and non-food expenditure was captured during the survey. It was found that for the total sample of respondents, rural households devote 61.7 percent of their budget on food. This indicates that sample respondents are moderately vulnerable to the effects of any adverse fluctuations in income and prices on their food consumption. However, separate analysis on the treatment and comparison groups shows that while the treatment group spends 56.7 percent of their budget on monthly food consumption, comparison group devote 67.1 percent of their expenditure on food. Therefore, we can

conclude that, the comparison group is more susceptible to food insecurity when their income reduces or prices of foodstuffs rise for whatever reason. However, note must be made that, only monetary outlays on food was considered to compute monthly food expenditure. The findings are similar to that of Smith and Subandoro (2005) cited in Smith and Subandoro (2007) where spending on food represents 65.5 percent of household's budget in rural Senegal.

The composition of the food basket of the sample respondents show that 50 percent of the total monetary expenditure on food is spent on cereal staples including pasta and lentils. Cereals are rich in carbohydrates but contain low protein and micro-nutrient contents. Expenditure on sugar and oil represents 21 percent of the total food budget with coffee and beans representing 8 and 6 percent respectively. Aggregate expenditures on egg, milk, butter, meat, fruits, potatoes and vegetables constitute around 16 percent of the household budget devoted to food. This indicates that rural households' food composition and consumption behaviour lacks appropriate nutritional contents in terms of proteins, vitamins and other micro-nutrients.

Share of household expenditure on food tells us only the quantity dimension of food security of the household. It determines how households access the quantity of food they consume. However, an important dimension of food security is the quality of food consumed by households as measured by calorie intake. It is well understood that households who frequently consume a wide variety of food from different food groups are more food secure in terms of caloric intake compared to those who depend on a specific food type for most of their food consumption (WFP, 2008). Dietary diversity has been used as a proxy indicator of diet quality and nutrient adequacy. Ruel (2002) defines dietary diversity as the number of different foods or food groups consumed over a given reference period. The WFP (2009) in its Comprehensive Food Security and Vulnerability Analysis (CFSVA) customized a food consumption score (FCS) to capture the different food consumption patterns observed in households. The FCS is based on dietary diversity which informs the number of food groups consumed by a household over a given reference period.

The FCS is calculated by examining the number of times certain food groups are consumed with in seven days prior to the survey multiplied by an appropriate weight assigned based on the nutrient density values of the respective food groups. Using WFP (2009) guidelines, information on dietary diversity of the sample respondents was collected for nine food groups (cereals, pulses, vegetables, fruits, meat, milk, sugar, oil and butter) on a seven day recall period. The FCS is then compared with pre-established thresholds to determine the status of the household's food consumption. Based on WFP (2009) guidelines, since the consumption of sugar and oil was common among the Eritrean population, the FCS thresholds were specified as follows;

- Poor food consumption : 0-28
- Borderline food consumption: 28.5-42
- Acceptable food consumption: >42

According WFP (2008), poor food consumption refers to poor consumption patterns in terms of macronutrient and micronutrient food contents. While the daily consumption of food could provide adequate carbohydrates such as cereal staples, it is likely to be deficient in protein contents. The limited diversity in the food types also compromises the micronutrient intake. Borderline food consumption group has a similar pattern to that of the poor food consumption group. However, vegetables, meat or eggs are accessed more often than the poor consumption group. Households are said to have acceptable food consumption when they have daily access to cereals and carbohydrates as well as a good combination of other foods including milk products, vegetables, fruits and meat or egg on a regular basis. This profile seems to indicate that the quantities of food consumed by households should satisfy their dietary needs. The outcomes of the FCS and expenditure share on food of the sample respondents are reported in Table 5.8 for comparison purposes.

Table 5.8: Share of food expenditure to total expenditure and food consumption score

Expenditure type	Treatment group		Control group		Total sample	
	Amount in Nakfa	Percent	Amount in Nakfa	Percent	Amount in Nakfa	Percent
Food expenditure	687,840	56.7	745,216	67.1	1,433,056.0	61.70
Nonfood expenditure	524,663.8	43.3	365,075.5	32.9	889,739.3	38.30
Total expenditure	1,212,503.8	100	1,110,291.5	100.0	2,322,795.3	100.00
Food consumption Groups	**Treatment group**		**Control group**		**Total sample**	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Acceptable	105	52.5	107	35.67	212	42.4
Borderline	92	46.0	191	63.67	283	56.6
Poor	3	1.5	2	0.67	5	1.0

Source: Field survey data, 2014; Note- official exchange rate: 1USD=15 Nakfa

As shown in Table 5.8, the majority of the sample respondent (56 percent) had borderline food consumption while 42 percent were categorized under acceptable food consumption. Analysing in terms of client status, the vast majority of the control group (63 percent) were in the category of borderline food consumption and 52 percent of the treatment group had acceptable food consumption. Therefore, more of the respondent in the treatment group enjoyed an acceptable food consumption compared to the control group in terms of diet quality. Comparison between share of expenditure on food and FCS proves that the control group with borderline food consumption spent a larger proportion of their budget (67 percent) on food. The WFP (2009) report suggests that households with borderline food consumption tend to devote a larger proportion of their expenditures on food, compared to other food consumption groups. The weighted average food consumption score in Table 5.8 also confirms that the mean consumption score for the treated respondents is higher (46) which is in the acceptable food consumption region while that of the control group is 41 (borderline region) and the mean difference between the two groups using t-test was found to be highly statistically significant at 95 percent confidence interval.

5.2.6.3 Non-food consumption and spending

Expenditure on non-food items is another outcome of interest in the analysis of livelihood outcomes. Respondents were asked to state their annual spending on 16 expenditure items including personal and household items, shoes and clothing, health and education, holidays and ceremonies etc. Six top non-food expenditure items constituted 84 percent of the total non-food expenditure and includes holidays and ceremonies, shoes and clothing, housing maintenance, soap and washing materials, health and education as well as transportation. Holidays and ceremonies accounted the highest proportion representing 41 percent of respondent's expenditure followed by expenditure on shoes and clothing which accounted 12 percent of the total expenditure. Expenditures on housing maintenance, soap and washing materials, health and education, as well as transportation accounted for less than 10 percent of the total expenditure each. Therefore, we can see that the majority of respondent's expenditure is concentrated on holidays and ceremonies. This component of expenditure occurs in non-frequent but on regular basis and requires relatively large lump sum amount of money. Households in rural areas of Eritrea exercise holidays and ceremonial festivities as they signify cultural, social and religious obligations. In some case, households save for most of the year just to spend what is saved during holidays and ceremonies.

Disaggregating the data by treatment and control groups show that, those who have been beneficiaries of the SMCP for long period of time (treated clients) enjoyed higher levels of non-food expenditure compared to new clients (comparison group). The average annual non-food expenditure for the treated group is higher by (17,182 Nakfa) than the control group and the mean difference using t-test was found to be highly statistically significant at 95 percent confidence interval.

5.2.6.4 Asset possession

Similarly household asset and livestock values were computed to examine the asset possessions of the respondents. It is well understood that in a rural setting where secondary asset markets are absent or poorly developed, it is difficult to ascertain the resale values of assets accurately (Barrett, *et al*., 2001:318). Therefore, respondents were asked to estimate

themselves the resale value of their assets at the time of the survey to calculate the current resale value of their asset holdings. Accordingly, in aggregate terms the mean resale value of the respondents' asset was found to be 17,059 Nakfa with the minimum and maximum being 530 and 205,100 Nakfa respectively.

As shown in Table 5.6, the mean resale value of household assets owned by the treatment group is higher (20,472 Nakfa) than the control group (14,784 Nakfa) with the mean difference being 5,688 Nakfa. To check whether the mean difference is significant, a two sample t-test was computed and it was found to be highly significant at 5 percent significance level. This could be due to the fact that, clients who have been beneficiaries of the SMCP own durable household assets such television, satellite receiver, DVD and water pumps relative to the new clients (comparison group) whose asset ownership is concentrated in the basic household items and agricultural implements.

Livestock contributes a variety of benefits to rural livelihoods such as food, income and employment through sale and trade, transportation, draft power for cultivation and as a form of saving in a situation where saving options and credit alternatives are limited. Sale of live animals is an important source of income and food particularly in times of drought and loss of crops. In the study areas, respondents were asked to indicate the resale value of the livestock they owned during the survey period and it was found that the average livestock value of the treated households is higher than that of the comparison households. The mean difference between the livestock values of both groups was highly statistically significant (t=4.425) as shown in Table 5.6.

There is a general consensus that in the absence of formal insurance and incomplete or totally absent credit markets in rural areas, livestock serves as a precautionary saving to smooth household consumption. Lange and Reimers (2014) argue that in rural areas of developing countries, livestock are hypothesised to constitute a major buffer stock against shocks such as drought and adverse price fluctuations.

In Eritrea where recurrent drought is a regular occurrence, households keep a variety of livestock which can be used as a buffer stock in times of drought, cover lump sum expenditures such as wedding, and other ceremonies and holidays as well as to take advantage of increased price to optimise household income. The quantity and the sale value of livestock in the study area can therefore be considered as a form of saving or self-insurance that can be liquidated during food shortages and finance expenditures that require large amounts of money.

5.2.6.5 Savings

The provision of microcredit allows households to promote and expand their assets and activities which in turn improve their livelihood. Similarly, saving facilities allow them to conveniently and safely accumulate surplus funds to create financial and livelihood stability. At present the SMCP in Eritrea offers microcredit services alone. Although saving is one component of its services, the SMCP has not started the mobilisation of savings from its clients. However, the SMCP mobilises mandatory savings as part of clients' obligation to access microcredit. The accumulated mandatory saving is then paid back to clients once they repay their loan fully. The fact that the provision of microcredit has dynamic effects on household assets, and income sources is expected to indirectly contribute to the saving capacity of households.

In order to assess their saving behaviour, respondents were interviewed whether they have been saving voluntarily during the past 12 months preceding the survey. Only 27 percent of the total sample responded positively of which 33 percent are from the treatment group and 23 percent from the control group. Therefore, the majority of the sample respondents (73 percent) have not been saving in the form of cash. Nearly all of the sample respondents (96 percent) mentioned low capacity to save as their prime reason for not saving. In the context of rural areas although cash saving is not common, households save in-kind particularly in the form of livestock as described above.

Per capita saving for the sample respondents who save during the past 12 months prior to the survey was found to be 2940 Nakfa ($196). As shown in Table 5.6, although per capita saving for the treatment group is higher than the control group by (2297 Nakfa), the mean difference using t-test was found to be statistically insignificant. Among those who save, 10 percent of the sample respondents keep their money in their house or in their mattress followed by bank deposits 6 percent and 4 percent in rotating saving and credit association (ROSCA) respectively. None of the sample respondents claimed to have savings in the form of jewelry. This shows that in the absence of formal or informal saving facilities rural households' preferred form of saving facility becomes their house. Although in-house saving is more accessible to withdraw cash any time, its physical risk and above all keeping the cash safe from multiple claims remains a challenge (Rutherford, 1999).

5.2.6.6 Risk exposure and coping mechanisms

Shocks and risks that affect rural household livelihoods negatively appear in multiple forms. Illness and death of household member, livestock diseases and deaths, climate variability, pests, flooding, theft, fire, reduction of income sources, unfavourable market trends such as inflation, institutional deficiencies etc. could pose significant constraints to livelihood endeavours. While some of these shocks and risks have idiosyncratic character affecting specific households such as illness and death of household member, others such as drought have covariate behaviour affecting a larger population. Kalinda (2014) in a study in rural Zambia found that households in rural areas face multiple covariant and idiosyncratic shocks such as market fluctuations, adverse weather changes, degradation of natural resources, and combines a variety of coping mechanisms to prevent, mitigate and cope up with the outcomes of the shock. Borner, Shively, Wunder and Wyman (2012) argue that poor rural households are more vulnerable due to their meager resources to cope up with economic hardships and their excessive dependence on economic activities such as agriculture for which returns are highly variable. Similarly, Bonye and Aasoglenang (2013) in their study of rural livelihood diversity in Ghana reported that adverse weather conditions aggravated the incidence of poverty among households and as a result they practice different stratagies such as diversify crop cultivation, livestock rearing, petty trading and out-migrant remittances.

Respondents were asked whether they encountered any negative event in the past 24 months prior to the survey. The majority of the sample respondents (77 percent) report that they encountered one or more events that have negatively affected their livelihood security. Comparison of the treatment and the control clients shows that more of the control clients (82 percent) reported their exposure to negative events compared to 71 percent of the treatment ones.

Table 5.9: Occurrences of negative events

	Treatment Group		**Control Group**		**Total sample**	
Type of negative event	Frequency	Percent	Frequency	Percent	Frequency	Percent
Major crop failure (drought)	127	63.5	224	74.67	351	70.2
Increase in consumer price (inflation)	18	9	53	17.67	71	14.2
Widespread death/disease of livestock	39	19.5	28	9.33	67	13.4
Illness, injury or death of household member	34	17.0	29	9.27	63	12.6
Theft, fire or destruction of property	3	1.5	7	2.33	10	2.0
Reductions of remittances	1	0.5	2	0.67	3	0.6

Source: Field survey data, 2014

As shown in Table 5.9 the majority of the sample respondents (70 percent) mentioned that crop failure as a result of drought ranks top among the negative events in the past 24 months prior to the survey. Drought is an example of a covariate risk that affects not only rural farm households but also the whole population in a country. It affects not only the food supply of people but also of their livestock. More of the control respondents perceived to have been hit by the drought compared to the treatment group which represent 74 percent and 63 percent respectively. Inflationary pressure and the death or illness of livestock stood second and third followed by illness, injury or death of household member.

The Eritrean economy is predominantly based on agriculture and over 80 percent of the population depends on traditional subsistence farming, including crop production and animal

husbandry. Like most developing countries, a peculiar feature of agriculture in Eritrea is that it is highly affected by climatic variability of which variations in rainfall takes the center stage. Rainfall pattern in Eritrea is explained by extreme variability within and between years, and spatial variations within short distances (GoE, 2007). The effects of soil erosion and widespread cutting of forests for fuel and construction over the years have also aggravated the adverse effects of drought. Drought affects the rural poor by reducing agricultural production and thus increases the price for food stuffs during the lean season. Thus, since the poor spend significant proportion of their income on food, a smaller increase in price is more likely to affect their food intake. It also reduces the natural supply of pasture for livestock and forces owners to sell their livestock at a lower price. Therefore, climate and rainfall variability can have significant effect on the food security of the rural people.

The increase in the general price of consumer goods or inflation depletes the meager income earned by the rural people. It constrains their purchasing power and exposes them to consumption risk. Although respondents' perception and knowledge about inflation varies, there is a general consensus that the Eritrean economy has been experiencing inflation over the past ten years (African Economic Outlook, 2014). Inflationary pressure combined with recurrent drought negatively affects livelihood outcomes in rural areas. Livestock constitute a substantial share of assets and source of income to the rural people. The prevalence of widespread disease or death of livestock brings about both production and consumption risk to rural households. Given the multiple benefits of livestock the loss of livestock can therefore severely restrain the production and consumption capacity of farm households. Equally important is the death, illness, or injury of a household member that has direct cost in terms of the expenditure made on prevention, care, cure or burial as well as opportunity costs in the form of forgone income and productivity.

Households exposed to risks and shocks exercise ex ante and ex post coping mechanism. The coping mechanisms in turn depend on multiple factors including the type and size of the shock, household characteristics, resource endowments and entitlements as well as contextual factors such as access to common resources, financial markets, employment opportunities and different policy variables etc.

Respondents in the study areas were found to have been implementing a variety of strategies to cope with the risks they faced. Withdrawing past savings particularly grain stocks, selling of livestock, borrowing of money from relatives and friends, engaging in casual employment, family support and a combination of two or more of these strategies were observed to be common practices among respondents. Out of those who reported they faced negative events, sale of livestock dominated with 30 percent of the sample respondents reporting as a coping strategy followed by withdrawal of past savings including use of previously accumulated grain stocks accounted for 23 percent of the sample respondents. Respondents (15 percent) were also found to have participated in casual employment in off-farm wage labour as a means of coping with negative events. Note must also be made that a substantial number of respondents (about 32 percent) combined two or more mechanisms to deal with the negative events they faced.

Established clients of the SMCP (treated group) were found more diversified in terms of managing their assets and income sources. While more than a quarter (28 percent) of the treatment group used their past savings and sold their livestock as a coping strategy, only 8 percent of them have participated in selling of their labour for off-farm casual employment. With regard to the new clients (comparison group), 31 percent sold their livestock, and 20 percent used their past savings for the same purpose. Compared to the treatment group, a greater proportion of the comparison group (20 percent) participated in off-farm casual employment activities. While 7 percent of the comparison group sought borrowing from friends and relatives, only 3 percent of the treatment group resorted to doing so. A possible explanation could be the fact that, the treatment group's being beneficiaries of the SMCP for relatively longer period of time could have helped to consolidate and strengthen their asset base and income sources to effectively cope without having to sell their labour and borrow from others, unlike to the control group. Furthermore, nearly no respondent in the sample was found to have sold his/her productive asset, household appliances, or jewelry and reduction of consumption or going hungry for the purpose of surviving negative events.

5.3 ECONOMETRIC RESULTS AND DISCUSSION

This section present the results generated using the logit regression and propensity score matching models specified in Chapter 4. The independent variables used in the logit regression model are grouped into four categories, namely: household demographic variables, socio-economic variables, programme related variables, and village related variables. The impact of participation in the SMCP on outcome variables was estimated after a test of comparability between the treated and controlled groups based on their propensity scores was ensured. The section also discusses the results in view of the conceptual approaches adopted and empirical evidences reviewed.

5.3.1 Determinants of household participation in the SMCP using logit regression

This section reports and discusses the determinants of household participation in the SMCP using a logit regression model specified in equation 7a. The explanatory variables hypothesised to determine the probability of household participation in Table 4.3 will be analysed. Participation in the SMCP in this study refers to the household's decision to borrow from the SMCP and remain an established client. The dependent variable is defined whether the household has been a client of the SMCP for more than three months and assumed a binary response variable with value '1' if the respondent participated in the SMCP and '0' otherwise.

The independent or explanatory variables were grouped in four categories. These include household demographic (age, gender, household/family size, marital status, education); socio-economic variables (land ownership, land size, ownership of irrigated land, livestock ownership, microenterprise ownership, income sources from permanent and temporary employment as well as from remittances, entrepreneurial or business experience, and exposure to risks or negative events); programme or loan related variables (amount of first loan offered by the SMCP, type of loan, and perception on mandatory deposit by clients); and finally infrastructure related variable (access to electricity, availability of roads).

Table 5.10: Logit regression results on the determinants of household participation in SMCP

Dependent variable [a]: Households participation in SMCP (Binary)				
Independent variables	**Estimated coefficients**	**Standard Error**	**P- Value**	**Marginal effects[b]**
Demographic variables				
Age	0.032	0.012	0.005***	0.005
Gender	0.138	0.296	0.641	0.017
Marital Status	-0.648	0.324	0.045**	-0.122
Household size	0.200	0.050	0.000***	0.037
Level of education	0.082	0.042	0.049**	0.015
Socio-economic variables				
Land ownership	-0.578	0.466	0.215	-0.097
Land size	0.104	0.115	0.366	0.022
Ownership of irrigated land	0.180	0.491	0.714	0.061
Livestock ownership	0.813	0.344	0.018**	0.144
Microenterprise ownership	-0.834	0.296	0.005***	-0.144
Income source from permanent employment	-0.618	0.421	0.142	-0.118
Income source from temporary employment	0.497	0.276	0.072*	0.085
Income source from remittance	0.322	0.425	0.449	0.049
Entrepreneurial experience	0.022	0.011	0.044**	0.005
Exposure to negative events	1.026	0.291	0.000***	0.187
Programme related variables				
Loan size(First round)	-0.301	0.021	0.015**	0.007
Loan type (Group loan)	-0.889	0.307	0.004***	-0.159
Perception of mandatory deposits	0.633	0.241	0.009***	0.106
Infrastructure related variables				
Village access to electricity	0.798	0.289	0.006***	0.128
Village access to roads	-0.141	0.376	0.708	-0.028
Number of observations	500			
Log likelihood	-268.324			
LR Chi-square (20)	136.36			
Prob > chi2	0.000			
Pseudo R^2	0.203			
Multicollinearity check (Mean VIF)	1.49			
Specification error check (linktest P-value)	0.649			
Model-to-data-fit check (Hosmer-Lemeshow P-value)	0.979			

* = Significant at 10%, **= significant at 5%, *** significant at 1%

Source: Field survey data, 2014

a- Dependent variable =’1’ if household participated in the SMCP and ‘0’ otherwise
b- Marginal effect is at mean value

i. Demographic characteristics of household

The logit regression outcome in Table 5.10 shows that there is a positive and highly statistically significant relationship between ***age*** of the client household and their participation in the SMCP at one percent significance level (P=0.005). All other things being equal, as age of the client increases, he/she is more likely to participate in the microfinance programme. This is in contrast to the life cycle hypothesis which predicts that the young are more likely to engage in active saving and borrowing activities with purpose of accumulating wealth to be used during their old age. The average age of respondents in the study area was found to be 47 years old and around 68 percent of the respondents' age was 40 years and above. One possible explanation which is peculiar to the Eritrean situation could be that currently the young are engaged in national service in various sectors of the economy and are not entitled to borrow from the SMCP. Another reason could be the fact that households in their middle 40s and above are expected to establish family and stable livelihoods and thus may demand for microcredit to engage in income generating activities and smooth consumption during periods of low agricultural output and farm income shortfalls.

Tang, *et al*., (2010), in their studies in rural credit demand in China found that older farmers were found to demand more credit because of their social network and social capital. Chen and Chivakul (2010) also argue that older borrowers are more likely to repay their loan and thus become favoured clients of lenders. However, Mpuga (2008), Chen and Chivakul (2008), argue that even though age has a positive relationship with the probability of borrowing from microfinance institutions, age squared tends to negatively relate with credit demand indicating that there exists an inverted 'U' shaped relationship between the age of clients and the probability of borrowing.

Household size was found to have positive and highly statistically significant relationship with the probability of participation in the SMCP (P=0.000) at one percent significance level. This result reveals that as household size increases, their exposure to consumption shock also increases which makes them more likely to use microfinance resources to normalise their exposure to shocks and risks. Moreover as Chen and Chivakul (2008) and Bending, *et al*.

(2009) argue that larger households are more likely to have higher dependents in the form of more children and more elderly that increases the probability of demand for credit. On the other hand, larger households with more economically active members can also participate in borrowing with the expectation that the contribution of adult members to household income could support the repayment capacity to settle their debt and serves as collateral for borrowing. Wabei (2012), Gandhimathi and Ambigadevi (2014) also found similar results that household size positively correlates with the probability of borrowing.

Married individuals were found to have less probability of participation in the SMCP relative to widowed, divorced, or unmarried individuals. Their negative relationship is statistically significant at 5 percent confidence level (p=0.045). The reason behind could be the fact that divorced, female headed households, and widowed clients are more likely to borrow from the SMCP due to their exposure to risks and shocks. These clients could be less privileged in terms of asset ownership, lack diversified source of income, and the support that could have been gained from the presence of a spouse.

On the other hand ***educational qualification*** of the respondents was found to have positive and significant relationship with the probability of borrowing from SMCP at 5 percent confidence level (p=0.049). The relationship is expected as functionally literate farm households tend to have more exposure to the external environment. Farm household with some years of schooling can also have the confidence and the skill to initiate and run income generating activity taking advantage of the opportunities offered by microfinance intuitions in their areas. This finding is in line with Chen and Chivakul's (2008) assertion that level of education such as primary and secondary may have positive effect on the household's participation in microfinance particularly in rural areas. Nevertheless, Bending, *et al*. (2009) note that, households with higher education who are expected to have formal jobs and thus higher income and collateral are more likely to use credit from formal financial institutions such as banks.

ii. Socio-economic characteristics of households

Livestock is an integral part of livelihood systems in rural Eritrea. ***Ownership of livestock*** by the respondents was found to have positive and statistically significant relationship with the probability of participating in the SMCP at 5 percent significance level (P=0.018). Respondents who own livestock are more likely to be clients of the SMCP relative to those who do not own. One possible reason could be that livestock serves as a collateral particularly to access individual loan from the SMCP in rural Eritrea. Thus, households who own livestock are more eligible for individual loan relative to those who do not own livestock. For example, farm household who own ox is more likely to be eligible for oxen loan (OL) product offered by the SMCP. Farm households in rural Eritrea practice mixed farming where crop cultivation and livestock production complement to each other in the livelihood of the farm household. During drought which results in crop failure, rural households have the option of either borrowing from the SMCP or sell their livestock to smoothen consumption of the household particularly to ensure food security. In the study areas, sample respondents and interviewed informants confirmed that clients borrowed from the SMCP to purchase food for both their family and their livestock. The purchase of forage (animal feed) was one of the most important reasons for respondents to apply for the SMCP loan facility.

The formation and expansion of microenterprises requires the availability of financial capital. In the logit regression, contrary to expectations ***ownership of microenterprises*** was found to have a highly statistically significant negative probability of borrowing from the SMCP. Household who own microenterprises were less likely to borrow and participate in the SMCP compared to those who do not own microenterprises. One possible explanation could be that, in the context of rural areas where microenterprises such as small shops, animal fattening, petty trade, teashops, snack, etc. are less sophisticated in terms of operation and financing implies that those who already own such enterprises might be less credit constrained. Therefore, those who already owned microenterprises are less likely to borrow from SMCP relative to those who did not.

Shocks and crisis are negative events that put pressure on the resource base of the household and as such destabilise their livelihood security. Respondents' participation in the SMCP was found to have positively related with the occurrences of negative events in the study areas. Household resilience to negative events (shocks and crisis) depends on their assets and entitlements. Those households with more ownership and control over assets are expected to be less vulnerable to exogenous shocks. Vulnerability is therefore, more prevalent in households with low income, low asset endowment, and entitlements.

Floro and Swain (2008) argue that in rural areas where farm households are dependent on subsistence rain-fed agriculture, farm output is highly exposed to environmental conditions such as drought and market fluctuations such as changes in input and output prices. When such occurrences are combined with unexpected illness or death of a family member or livestock, they could lead to a substantial loss of income or consumption and potentially threaten the survival of the household. Moreover, the absence of cash savings and insurance mechanisms would leave households in rural areas with the only option of joining the SMCP to protect themselves and their livestock against unexpected consumption shortfalls. Hence, the highly statistically significant positive relationship between the ***occurrence of negative events*** and probability of participation shows that the more the household anticipate or exprience negative events, the more likely would be their decision to be a client in the SMCP as it appears in Table 5.10.

Having past ***business or entrepreneurial experience*** in the areas of microenterprises farm households engage was found to be a variable affecting respondents' decision to participate in microfinance programmes. Entrepreneurial experience in a rural context such as Eritrea includes basic financial literacy, the ability to explore marketing opportunities, ability to mobilise and organise productive resources with the objective to generate income, and some skills on how to handle and operate any activity oriented towards generating income. In the study areas, having business experience was found to statistically significantly affect respondents' probability to participate in SMCP at 5 percent significance level (P=0.044). This means that households with some kind of business orientation and know-how are more likely to participate in the SMCP. The possible explanation could be that households with

some experience on how to run a business venture whether it is related with animal fattening, petty trade, small shops and kiosks, service giving and other microenterprises are expected to initiate or expand their enterprises and thus requiring capital which can be accessed from microfinance institutions such as the SMCP. Fatimah-Salwa, *et al*. (2013) from their studies in Malaysia confirmed that experienced microcredit clients are more successful than inexperienced ones in terms of handling problems as they occur by applying their previous experience.

iii. Programme related characteristics

Programme characteristics refer to the SMCP characteristics in terms of its first round loan size, type of loan product offered, perception of clients on its mandatory deposits, and are expected to influence the decision of household participation. Loan size granted to clients also determines the decision of households whether or not to borrow from the SMCP. The ***amount of the first loan*** granted to clients was found to have a significant negative effect on the probability of borrowing from SMCP at 5 percent significance level (P=0.015). The SMCP applies fixed interest rate and at the same time caps the size of the first round loan at specific amount. Clients have to decide whether to take up that fixed amount depending on the sufficiency of the amount to finance their projects.

The logit regression outcome suggests that the amount of the first round loan as determined by the SMCP negatively affects the probability of participation perhaps due to its insufficiency to meet clients' requirement. This is supported by the fact that more than 50 percent of the established clients and the majority of interviewed SMCP authorities claimed that the size of the first loan was perceived to be too low to be used as a startup capital to initiate a meaningful economic activity. Particularly, for solidarity group loan clients where the starting amount is 3000 Nakfa (USD 200), the amount is not sufficient even to purchase one goat or sheep for clients whose objective is animal fattening.

Similarly, the amount of first round of loan for oxen loan 10,000 Nakfa (USD 666), small business loan 20,000 Nakfa (USD 1333) and irrigated agricultural loan 30,000 Nakfa (USD

2000) were claimed to be too small to enable the client to achieve the target objective. According to Kisto (2014), demonstrates that the smaller the loan size offered by the microfinance institution, the lesser is the capital to start a business enterprise. Clients who perceive that the amount of first loan as being small are forced either to find supplementary sources or may end up using the loan for consumption purposes which eventually results in compromising their repayment ability.

The type of loan offered by the SMCP was also analysed to evaluate its effects on the probability of households borrowing from SMCP. The SMCP offers two types of loans, namely, solidarity group loan and individual loan. It was found from the logit regression that, the probability of household participation in the SMCP had highly significant negative relationship with the solidarity group loan at one percent significance level (P=0.004). This means that clients were less likely to participate in the SMCP if the loan type available is solidarity group loan rather than individual loan. In other words, the latter is more preferred which is also evident from the fact that only 24 percent of the total respondents in the study areas either applied or would like to apply for solidarity group loan.

In addition to the small loan size granted to group loan clients, possible reasons for the low preference for group based loan could be the transaction cost to group members in the form of finding suitable group members, matching the needs of group members, monitoring and enforcement costs. This is besides the low purchasing power of the funds due to inflation. In this type of loan, the default of a group member threatens the remaining members of the group to repay for his/her default or else the group will not be allowed for further loan. Authorities from the SMCP and informants interviewed from the study areas reiterated that small loan size and enforcement cost during defaults were the major reasons for the deterioration of solidarity group loan in rural Eritrea.

Mandatory deposit has been considered as an integral part of accessing credit in many microfinance institutions. It was introduced with the intension that the poor must learn how to save. It has the advantage of instilling financial discipline on clients. However, mandatory deposits have the disadvantage of locking resources and restrict the withdrawal and use of

them till full repayment is made, effectively serving as collateral substitute (Fiebig, *et al*., 1999). Some clients consider mandatory deposit as additional costs to access credit. How clients perceive and evaluate the amount of mandatory deposit required to access loans from microfinance institutions are likely to affect their decision to borrow. The SMCP mobilises mandatory deposit as part of the requirement for accessing credit. In the logit regression in Table 5.10, evaluation of mandatory deposit by households was found to have statistically positive influence on the probability of borrowing (P=0.009). The findings suggest that client households who evaluate the amount of mandatory deposit as fairly reasonable are more likely to borrow from the SMCP relative to those who consider it as relatively high. Although mandatory deposit embodies locked-in resources, it ultimately remains the resources of the client. Therefore, clients who view mandatory deposit as benefits and potential long-term resources are more likely to consider them as an opportunity rather than a cost and thus increase their probability of borrowing. Another explanation could be that in the absence of any alternative credit facility as in rural Eritrea, households have but to comply with the requirements imposed by the SMCP.

iv. Infrastructure related characteristics

Infrastructural facilities available at village level are expected to affect the livelihood activities of households. Access to electricity, clean water, health services, road networks, etc. has the effects of supporting the productive use of household assets/resources in rural areas. In the present study an attempt was made to see the link between the village's ***access to electricity and roads*** to the respondents' probability of participating in the SMCP. Access to electricity and roads do not represent ends in themselves. They are means by which they can facilitate a set of activities that improve welfare, increases productivity, generates income, reduces cost of production, etc. (Attigah and Mayer-Tasch, 2013).

For example, access to electricity in rural areas is expected to raise productivity and increase profits from microenterprises by allowing the application of activities such as water pumping for irrigation, drilling, sawing mills, cold chains for small shops, and restaurants, milk processing, beef storage and so on. In the logit regression output (Table, 5.10) households residing in villages with access to electricity are more likely to participate in the SMCP.

Therefore, village access to electricity was found to have a highly statistically significant positive relationship with the probability of participating in (SMCP) at one percent significance level (P=0.006). One explanation could be the fact that, with the availability of electricity, households could invest their microfinance resources in a more productive use that increases their income generating and repayment capability. However, contrary to expectation access to roads was found to have negative but insignificant association with the probability of borrowing from the SMCP.

The logit regression coefficients are estimated by the maximum likelihood method. The coefficients tell only the direction of change of the predicted probability of the dependent variable to a change in one or more of the explanatory variables. Direct economic interpretation cannot be made based on these coefficients (Greene, 2003). Therefore, a marginal effect is computed in order to address the limitations of the logit model. For binary or categorical independent variables, marginal effects measure how the predicted probabilities of the dependent variable change in response to a change of these independent variables from 0 to 1. For continuous independent variables, marginal effects measure, the instantaneous rate of change in the dependent variable as a result of a unit change in the these variables (Williams, 2015). Therefore, the marginal effects can be defined as a measure of responsiveness of the change in the predicted probabilities of the dependent variable due to changes in the explanatory variables.

The marginal effects are provided on the last column of Table 5.10. For example, age is a continuous variable and the result of the marginal effects for age indicates that a one year increase in the age of the respondent would increase the probability of participation in the SMCP by 0.5 percent. Similarly an additional member in the household size results in an increase of the probability of participation in the SMCP by 3.6 percent. One additional year of schooling in the respondents' level of education would increase the probability of participation by 1.4 percent. The result of the type of loan proves that the probability of participating in the SMCP would decline by 15.8 percent if the available loan type is only group loan. With regard to the effects of livestock ownership, the probability of participation increases by 14.4 percent when respondents own livestock.

Furthermore, when the village where the respondent resides has access to electricity, the probability of participation increases by 12.7 percent whereas when the respondent owns microenterprises, his/her decision to borrow declines by 14.3 percent. Moreover, when the respondent perceives that a negative event had affected his/her livelihood, and he/she evaluates the amount required for mandatory deposit as being low, his/her probability of participation in the SMCP increases by 18.6 and 10.6 percent respectively. General observation shows that respondents decision to make use of the SMCP services reacts positively and strongly to changes to the type of loan provided (group vs. individual), livestock ownership, temporarily employed households, village access to electricity, positive evaluation of mandatory deposit, occurrence of negative events to the household that adversely affect their livelihood. On the other hand, the probability of participation in the SMCP negatively and strongly responds to changes in available loan type, and ownership of microenterprise.

As it appears in Table 5.10, 13 variables were found to have statistically significant influence on respondents' probability to participate or borrow from the SMCP. Age, household size, amount of first loan, business experience, type of loan, livestock ownership, receipt of income from temporary employment, village access to electricity, microenterprise ownership, occurrence of negative events have significant relationship with the decision to participate in the SMCP in rural Eritrea.

On the other hand, gender, land ownership, land size, permanent employment, availability of remittance income, village access to roads do not have significant effect on the household's participation in the SMCP and therefore do not determine participation in the SMCP.

Moreover, a logistic regression that computes the odd ratio was reported to provide more direct interpretation of the logit coefficients displayed in Table 5.10. The odd ratios are reported in Appendix I. The logit coefficients and the odd ratio essentially convey the same idea. Both report binary outcome estimates. The logit model reports estimates of coefficients

whereas the logistic model reports the exponentiated coefficients called odd ratios (Newton, 2000).

According to the results of the logistic model in Appendix I, when the age of the client increases by one years he/she is one times more likely to participate in the SMCP. Married individuals are o.5 times less likely to join the SMCP compared to those widowed, divorced or unmarried. When household size increases by one member, the household is 1.2 times more likely to participate in SMCP. Similarly when the household head level of education increases by one year, she/he is one times more likely to participate in the SMCP. With regard to the socio-economic variables, a household that owns livestock is two times more likely to join the SMCP whereas those who own microenterprises would be 0.4 less likely to participate in the SMCP. Households who earn income from temporary employment are 1.6 times more likely to join the SMCP. Households with entrepreneurial experience are one times more likely to participate in SMCP compared to those without any experience. Households that anticipate or experience negative events (risks) are 2.7 times more likely to decide to participate in the SMCP. As far as programme related variables are concerned, when the loan type available for offer is group loan, households are 0.4 times less likely to participate in the SMCP as compared when the loan type is individual based loan. Similarly households that perceive the mandatory deposit required by SMCP is as positive would be 1.8 times more likely to join the SMCP. Households who reside in a village with access to electricity are two times more likely to decide to participate in the SMCP. The P-values and the significance level as well as the standard errors are similar to that of the logit model shown in table 5.10.

5.3.1.1 Goodness-of-fit test

The purpose of the goodness-of-fit test is to assess the robustness of the results in terms of the model's overall level of significance, check the existence of multicollinearity, evaluate whether the explanatory variables are correctly specified, and check whether the model fits the data set. The log likelihood Chi-square is a generalized test to check whether the model as a whole is statistically significant. Evaluating the overall goodness of fit of the logit

regression model as it appears in Table 5.10, shows that the model is successful in explaining the explanatory variables that affect the probability of respondents' participation or decision to participate and become clients of the SMCP. The likelihood ratio test has a Chi-square statistic equal to 136 with a P-value of 0.000 indicates that the model as a whole is statistically significant. This confirms that, over all, the model is relatively accurate in predicting whether or not respondents in the sample are likely to participate in the SMCP services given the observed explanatory variables. A P-value of less than 0.05 (0.000 in the model) shows that all the coefficients in the model are different from zero. In other words, the highly statistically significant P-value tells us that we fail to accept the null hypothesis that the parameter estimates are equal to zero at 95 percent confidence interval. Furthermore, the percentage of correctly predicted probability from the data set is 71.40 percent which shows the model successfully predicts the likelihood of respondents' participation in the SMCP

A check was also made whether the model suffers from multicollinearity or not. Multicollinearity is a situation where two or more explanatory variables in the model are correlated to each other making the standard error of the coefficient very large and obtaining a unique estimate of the regression coefficient difficult. Two common measures used to check multicollinearity are the variance inflation factor (VIF) and tolerance level. Tolerance level shows how much collinearity a regression analysis can tolerate. The VIF indicates the extent to which collinearity causes inflation of the standard errors. A VIF not larger than 10 or tolerance level of less than 0.1 indicates that multicollinearity is not a problem. A test of multicollinearity in the model proves that, multicollinearity is not a problem with the mean VIF of 1.49 which is less than 10.

Whether or not the data fit the logit model well was also checked using the Hosmer-Lemeshow goodness-of-fit statistic. The Hosmer-Lemeshow rank subjects according to their predicted probability of a positive outcome and divide them into a number of equally sized groups. It measures how well the predicted and observed frequency are closely matched and the closer the match and the better is the fit of the model. It is computed as the Pearson chi-square from the predicted and observed number of positive outcomes in each group. A large

or insignificant P-value suggests that the model fits the data reasonably well. Evaluating, the logit regression model using the Hosmer-Lemeshow goodness-of-fit statistic suggests that the model fits the data of this research study sufficiently well with large or insignificant P-value (0.979).

The logit regression model assumes that there exists a linear relationship between the outcome variable and the explanatory variables. Neither the left hand side of the equation that contains the outcome variable nor the right hand side that contains the predictor variables together with the link function (logit regression) should be incorrectly specified. This means that all the explanatory variables should be relevant to the model, the model should be the correct model and that the relationship between the logit outcome and the independent variables is linear. Failure to see one or more of these criteria leads to specification error in the model. A linktest command in STATA version 12.0 was run to check if the model used is correctly specified. The result suggests that the model is correctly specified with an insignificant P-value (0.649) for the linearly predicted value squared (_hatsq). This shows that there was no specification error either in the form of an omitted variable or misspecified link function.

5.3.2 Impact estimation using propensity score matching model

In this section, the impact of the treatment intervention (participation in the SMCP) will be estimated using a PSM model. A cross-sectional design was applied in this study and, therefore, PSM method is more appropriate to assess the impact of an intervention using a cross-sectional data set. Impact assessment involves three broad variables. These are:

- **Independent variables**: the independent variables include demographic variables, socio-economic variables, SMCP (programme) characteristics, and village level characteristics as presented in Table 4.3. These variables are econometrically controlled through the logit regression in order to assess the impact of the treatment variable on outcome variables. Variables that are expected to affect both participation and outcome are included in the independent variables.

- **Treatment variable:** household participation in the SMCP is the treatment variable used to assess the impact of the programme on livelihood outcome indicators.
- **Outcome variables**: outcome variables refer to the results on the treatment variable. Six outcome variables are considered to represent livelihood outcomes due to participation in the SMCP as presented in Table 5.11. These are: (1) profit generated from microenterprises; (2) food consumption expenditure; (3) non-food consumption expenditure; (4) value of livestock; (5) value of household assets; and (6) household savings. These outcome variables are continuous variables.

In the descriptive analysis section of this chapter, an attempt was made to describe what type of assets rural households own; what type of strategies households pursue to achieve their objectives; and what are the outcomes achieved from these assets and strategies. A simple descriptive comparison proved that there exists a statistically significant mean difference between the two groups on the relevant outcome of interest (see Table 5.9), this difference cannot be solely and confidently attributed to the participation of the treatment group to the SMCP. It is therefore, hardly possible to conclude that any difference in any outcome variable is due to the household's participation in the microfinance institution only.

Participation in microfinance is expected to be influenced by the household's observable and unobservable characteristics. The observed variables that include households' socio-demographic, programme and village characteristics were identified and estimated using logit regression model as shown in Table 5.9. Assessing the impact of the SMCP on household livelihood outcome indicators without controlling the observed variables would result in biased estimates and unwarranted conclusion about the effectiveness of the programme on livelihood improvement. The control of observed factors through regression is expected to eliminate the selection bias inherent in nonexperimental impact evaluation.

5.3.2.1 Assessing comparability between treated and controlled groups

As explained in chapter 4, the idea of applying the PSM model involves that participant households who are observationally comparable to nonparticipants would be matched by

determining their propensity scores and the average difference in outcomes across the two groups is attributed to the impact of the programme. The application of the model presupposes the satisfaction of certain assumption and conditions. The STATA version 12.0 software has a built-in system that checks the fulfillment of these assumptions in the model based on the data set. Lee (2013) argues that the balancing test is satisfied when all the relevant differences between the treated and controlled groups that affect outcome are captured and controlled in the observable characteristics so that potential outcomes are independent of treatment assignments.

The first step in the application of the PSM model is to estimate the propensity score using the logit model. The model estimated the probability that households participate in the SMCP given their socio-demographic, programme and village characteristics. The second step is to check the satisfaction of the model's basic assumptions mainly the common support or overlap assumption in the distribution of the propensity scores. The common support defines the distributions of the propensity scores and identifies the overlap between the treatment and comparison groups. Table 5.11 displays the distribution of the propensity scores. The confirmation that the common support condition is satisfied proves that control and treatment groups are comparable and matching is possible.

Table 5.11: Distribution of propensity scores between treated and control groups

Inferior of block of propensity scores	**Treatment: Participation in SMCP**		**Total**
	Controlled group	Treated group	
0.07	75	14	90
0.2	105	44	143
0.4	59	62	127
0.6	22	45	65
0.8	4	35	40
Total	**265**	**200**	**465**

Source: STATA output from field survey data, 2014

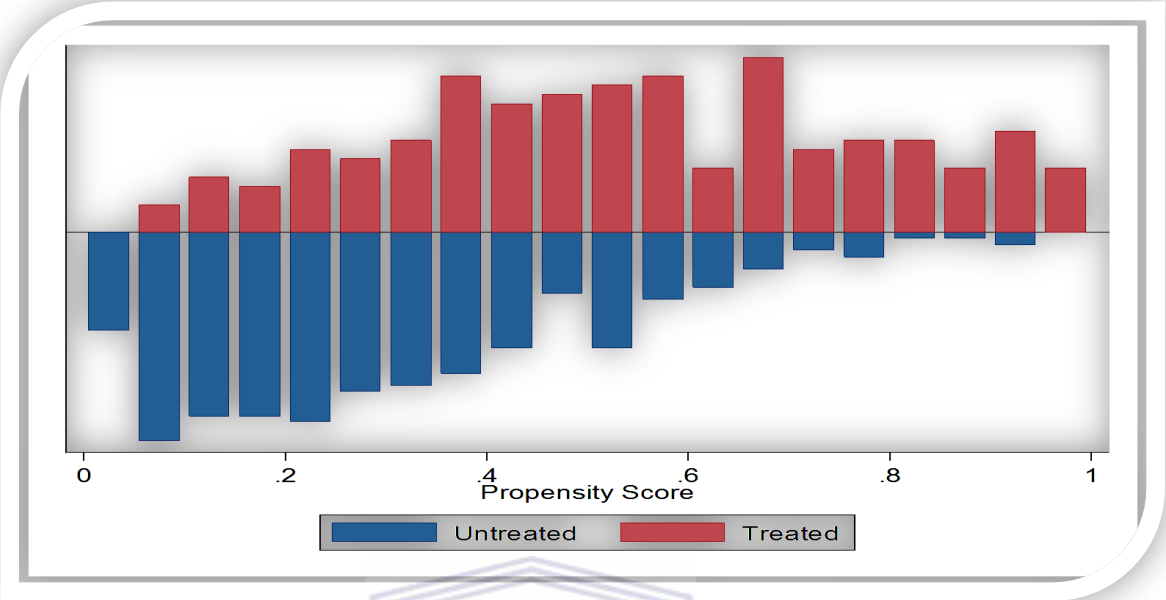
As it appears in Table 5.11, in each block the number of treated households is different from the number of comparison households. Although originally 200 households in the treatment

group and 300 in the comparison group had been interviewed, after matching on the basis of the propensity scores of observed characteristics, the number of households in the comparison group was reduced to 265 households. This indicates that 35 comparison households were excluded from the matching procedure since their characteristics lie outside the common support region. From the table, it appears that in each block the number of comparison households is different from the number of treated ones. This is because the procedure applies matching with replacement. According to Becker and Ichino (2002), matching with replacement allows a control observation to be used several times as a match with a treated observation. The empirical distribution of the propensity score are also presented in Figure 5.2.

Based on the data set the STATA output shows that the common support region lies in the region of [0.075, 0.994] and 5 blocks were found to lie within the common support region. The mean propensity score was found to be 0.426 with a standard deviation of 0.232. In all the blocks the balancing property is satisfied and this ensures that there is no significant difference between the mean propensity scores for the treated and controlled observations in each block.

The distribution of the propensity score for the treated and control group is displayed in histogram shown in Figure 5.2. The propensity scores vary from 0.07 to 0.9. The red on the top shows the distribution of the propensity score for the treated group and the blue represents that of the untreated group.

Figure 5.2: Empirical distributions of propensity scores between treated and untreated groups

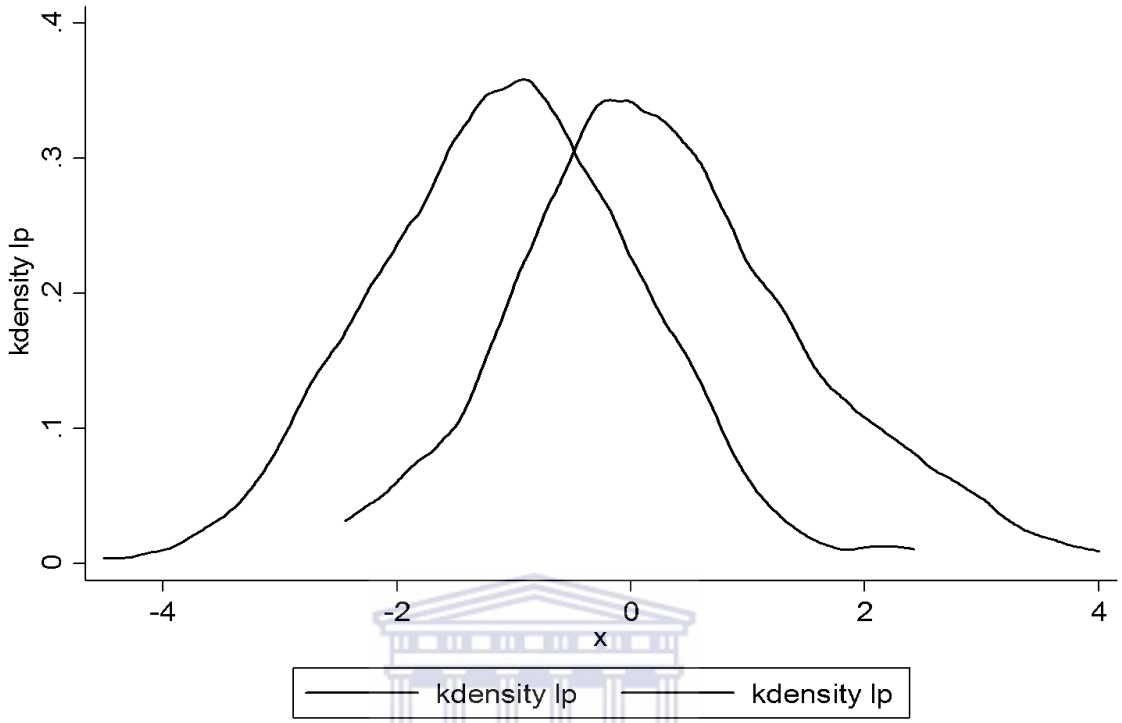


Source: STATA output based on field survey data, 2014

For the majority of the treated group (75 percent), the propensity score lies in the range 0.2 to 0.6. Whereas for almost 90 percent the comparison group the propensity score falls in the range 0.07 to 0.4. The distribution shows that there is sufficient overlap between both groups and therefore reasonable matching can be made. Furthermore, the fact that the balancing property is satisfied implies that the propensity score matching estimators fulfill the conditional independence and overlap assumptions that minimise the bias in the estimated outcomes.

In order to check normality in the distribution of the propensity scores, a Kernel density graph is also drawn using the logs of the odds (sometimes called the linear predictor). In the Kernel density graph shown in Figure 5.3, there appears a normal distribution in the log of odds of propensity scores.

Figure 5.3: Distribution of log odds of propensity score



Once the necessary checks and tests of the PSM model are confirmed and the control and treatment groups were proved to be in balance, the ATT, the t-statistic and bootstrapped standard errors for each of the matching estimator was computed for the selected livelihood outcome indicators. Four matching methods were used to demonstrate the robustness of the results as shown in Table 5.12. The four methods used progressively more and more information (from the nearest neighbour matching that makes use of the closet propensity scores; to stratification matching that classifies and matches subjects within each strata; and to kernel matching that utilises all comparison subjects) to determine a match between both groups. The results of the different PSM methodologies on the relevant outcome indicators are reported in Table 5.12. As it appears in the table, the statistically significant values in the t-statistic offer strong evidence that the difference in livelihood outcomes between both groups did not occur by chance, but are attributable to their participation in the SMCP.

The fact that the four different matching methods (nearest neighbour, radius, kernel, and stratification) as shown in Table 5.12 resulted in almost similar impact values indicate that,

overall, the model used is fit to the data set available. This means that, comparison between the values of the outcome indicators obtained using the four matching methods do not exhibit an outlying behaviour. In addition, the use of the same data collection instruments for the treated and control groups, the selection of sample respondents from rural areas that exhibit the same livelihood features, the incorporation of as many observable variables as possible that could influence both participation and outcome, the use of matching with replacement and more comparison household samples relative to treatment group samples were potential justifications for the robustness of the PSM results and are expected to reduce bias inherent in nonexperimental study designs. Furthermore, it is worth mentioning that it is rather difficult to calculate the analytical standard error in a situation where matching with replacement is applied (Bryson, *et al.,* 2002). Therefore, a 'bootstrapping' method was used to estimate reliable standard errors.

Table 5.12: Estimation of ATT using propensity score matching model

Outcome variable	Matching estimator	No of treated HH[a]	No of control HH	ATT[b]	Bootstrapped standard error	t-statistic
Annual profit (in Nakfa)	Nearest neighbour	200	105	19745.4	5441.9	3.628
	Radius	200	265	22380.8	4180.6	5.353
	Kernel	200	265	17766.4	5115.0	3.473
	Stratification	200	265	17858.3	4840.5	3.689
Asset value(in Nakfa)	Nearest neighbour	200	105	6646.8	3314.4	2.005
	Radius	200	265	6951.0	2596.5	2.677
	Kernel	200	265	7979.0	2650.1	3.011
	Stratification	200	265	7644.9	2951.5	2.590
Livestock value	Nearest neighbour	200	105	47356.0	14436.3	3.280
(in Nakfa)	Radius	200	265	37953.8	11042.0	3.437
	Kernel	200	265	42001.2	12767.2	3.290
	Stratification	200	265	40215.0	12539.0	3.207
Annual non-food expenditure (in Nakfa)	Nearest neighbour	200	105	18220.6	3543.0	5.143
	Radius	200	265	16135.8	3212.2	5.023
	Kernel	200	265	16699.8	3341.5	4.998
	Stratification	200	265	16590.0	3150.8	5.265
Monthly food expenditure (in Nakfa)	Nearest neighbour	200	105	1491.5	617.4	2.416
	Radius	200	265	1582.3	241.1	6.561
	Kernel	200	265	1444.8	581.6	2.484
	Stratification	200	265	1107.9	587.0	1.888
Annual saving (in Nakfa)	Nearest neighbour	200	105	3093.0	1633.0	1.894
	Radius	200	265	2528.4	1353.3	1.868
	Kernel	200	265	3017.1	1257.5	2.399
	Stratification	200	265	3157.2	1383.0	2.283

Source: STATA output, field survey data, 2014
Note: [a] household [b] Average treatment effect on the treated:

Table 5.12 shows the values of ATT for the different livelihood impact indicators using four propensity score matching estimators. Baser (2006) notes that none of the proposed propensity score matching methods in the literature is apriori superior to one another. Therefore, there is no reason to choose one over the other. The ATT is estimated by matching of treated and comparison households on the basis of their propensity scores. In all the matching algorithms the treated households comprise 200 households. In the radius matching, the caliper was imposed to be 0.1. The choice of caliper was done at random but a

smaller caliper is more likely to discard more of the sample units from both groups from the matching process. In the nearest neighbor matching a random draw from the comparison households was made depending on the closet propensity score possible to the treated group and 105 households were selected for matching. This method does not impose the Common Support assumption. In the kernel matching a bandwidth of 0.01 was used for estimating the kernel function and 265 control households were selected for matching based on their propensity scores. In stratification matching, five blocks or strata were formed as shown in Table 5.11 with a total of 265 control households eligible for matching. The table presents quantitative outcome results based on bootstrapped standard errors.

Before discussing the results, it is worth describing the loan characteristics of the treated group so that relevant associations could be made to understand the results. The treated group comprises of 200 households. These households have been in the SMCP for an average of 44 months (almost four years). The average cumulative loan disbursed for these households was 55713 Nakfa (3714 USD). On average each client household has received SMCP loan for 3.6 rounds. Average cumulative involuntary deposit was 2430 Nakfa (162 USD). The deposit to loan ratio amounts to 0.04 Nakfa. This means that treated households were required to deposit 4 cents from each one Nakfa they borrow from SMCP.

Given these general background, the outputs of the different matching estimators suggest that, participation in the SMCP brings a highly statistically significant average effect (t >1.96) in almost all selected livelihood outcome variables for the treated households in rural Eritrea. The average annual profit generated from microenterprises was higher by an amount of 17000-22000 Nakfa (1133-1466 USD) across the four matching estimators. The average effect was found to be significant as measured by the t-statistic. The average asset value held by the treated households was found significantly higher than the control households by an amount of 6000-7000 Nakfa (400-466 USD) in all the matching methods. Livestock assets owned by the treated households constitute the highest effect due to participation in SMCP across all matching methods relative to other outcome indicators. The average value of livestock for the treated households was higher than for those comparison households by an estimated amount of 37000-47000 Nakfa (2466-3133 USD) and it was highly significant.

Participation in the SMCP has also proved to have a highly positive significant effect on food and non-food expenditure items. Annual expenditure on non-food items of the treated households was higher than nontreated ones by an amount of 16000-18000 Nakfa (1066-1200 USD) in all the matching estimators. Similarily monthly average food expenditure was higher for the treated households by an amount of 1000-1500 Nakfa (66-100 USD) compared to the control households and it was highly significant across the matching methods except in stratification matching. Annual average saving (voluntary) was also found to be higher for the treated households compared the control ones though the amount was insignificant for the nearest neighbor and radius matching.

- **Impact on profits from microenterprises**

The average annual profit obtained from microenterprises was found to be significantly higher for the treated households compared to the controlled ones. One possible reason for which participation in SMCP significantly contributed to higher profits generated from off-farm and microenterprises of the treated group could be because the borrowed funds may have been invested directly on income generating activities or indirectly could have reduced the burden on such enterprises by smoothing household consumption. Consumption-smoothing could have enabled households to avoid the sale of assets that generate future income. Not only that but it may also have enabled them to acquire assets that potentially open up opportunities for income earning alternatives. Borrowing from SMCP could also have permitted treated clients to engage in trading activities particularly small scale trade that requires small funds, uses family labour, could be offered at relatively lower price and highly demanded by the local population. As argued by FAO (2000), and Islam (2009), the opportunities of investing in small off-farm microenterprises, the production effect of acquiring uninterrupted input supplies due to credit accessibility and the trade effect of microcredit could be the possible channels through which participating in the SMCP resulted in a significantly higher annual profit to the treated households compared to the untreated ones. Similar findings were obtained by (Barnes, Gail, and Kimbombo 2001; De Mel *et al*., 2008; Karlan and Zinman 2009; Hermes and Lensink, 2011; Khandker and Samad 2013).

- ***Impact on livestock and non-livestock assets***

The asset possession of the treated group as measured by the value of livestock and household amenities as well as agricultural implements was found to be significantly higher than the control households as shown in Table 5.12. The finding could be corroborated by the possibility that households could have either directly used the microfinance resource to purchase household amenities and agricultural tools or indirectly the increased returns from microenterprise profit might have allowed to possess these assets. Microfinance institution by providing lump-sum cash allows households to own productive assets and household utensils. The Eritrean rural population is susceptible to negative events and shocks such as drought because of their predominant dependence on subsistence agriculture and small initial asset endowment as well as non-existent or poorly functioning output and input markets. Therefore, strengthening the asset stock could serve as a buffer against shocks and a means to stabilise consumption. Similar findings on the effects of microfinance on household assets were documented by Adjei and Arun (2009), Barnes *et al*. (2001) and Salia (2014). Salia found that, on aggregate, borrowers acquired more assets than non-borrowers on a study conducted in Tanzania.

Livestock ownership as measured by its current value was found to be significantly higher for the treated households than for the control ones across the matching methods (see Table 5.12). One possible explanation could be that borrowing from the SMCP could have enabled households to purchase new ones or add to the existing stock. Furthermore, the provision of financial resources might have contributed to the sustenance of existing livestock by purchasing forage for feed and other inputs such as animal medicine. Another possible justification may be related to the case that credit opportunities from the SMCP could have avoided the sale of livestock during the lean season by supplementing food consumption expenditure to the household. Crépon *et al*. (2011) in their assessment of the impact of microcredit in rural Morocco found that access to credit has increased the stock of animals held, and increase in sales of livestock. They also found that households were observed to diversify in terms of the type of livestock and livestock products sold.

In the absence of saving and insurance facilities in rural areas, microcredit may replace and serve as an insurance mechanism. The fungibility of credit gives households an intertemporal benefit by postponing the untimely and forced liquidation or sale of livestock during drought times. The SMCP offers a loan product that exclusively targets livestock. The loan fund is dedicated to the purchase of animal feed or forage. Its objective is to avoid the stress of selling livestock at a lower price during drought where animal feed becomes excessively scarce. Islam (2009) refers to such insurance role as the timing effect of microcredit. In this case the use of the SMCP services might have enabled rural households to become more resilient and capable of effectively withstanding shocks without compromising their productive asset and animal stock.

Interview made with the SMCP authorities at all levels and village administrators attest to this fact. All of the informants cited that the differences between clients and non-clients lies in the ability of borrowers to save and sustain their livestock during hard time where feeding from the natural pasture becomes difficult. One of the village administrators from Tekombia branch stated that livestock that belong to the non-clients were observed either of dying due to lack of feeding or sold at a lower price during periods of drought. Therefore, there seems to be sufficient reason to claim that borrowing from the SMCP has contributed to the significantly higher difference in the value of livestock owned between the treated and controlled groups.

- ***Impact on food and non-food expenditure***

Consumption expenditure in this study is composed of spending on food and non-food items. The average consumption spending on food and non-food items for the treated households is significantly higher than for the comparison households, as shown in Table 5.12. Possible explanations for such result could be that the positive significant contribution of the treatment variable on profits and assets holdings (livestock and non-livestock) of the treated group might have contributed to the relatively higher consumption expenditure of the group itself. Consumption expenditure may have been financed from profits earned and/or from sale of assets particularly livestock assets. This is the indirect contribution of borrowing from

the SMCP on consumption expenditure. Moreover, the amount borrowed may have also been directly spent on consumption. The assumption that credit is fungible, i.e., it could be used for multiple purpose justifies this argument. This is consistent with findings of Hossain (2012); Khandker and Samad (2013); Diro and Regasa (2014), who concluded that microcredit improved family consumption in Ethiopia and Bangladesh respectively.

Particularly when it comes to expenditure on food, the treated households may have used the financial resource to improve their farm productivity by purchasing seeds, fertilizer, pesticides, farming tools and other agricultural technologies that increase food production. This is the supply effect of microcredit. On the demand side, the borrowed funds may have been spent directly on food consumption. During shocks such as drought, natural disaster, market fluctuations, livestock death or sickness, injury or death of household member (breadwinner), smoothing food consumption is accorded superior priority over accumulation of income or other assets. This is equivalent to the insurance role of microcredit (Islam, 2009; FAO, 2000).

Treated households were also found to have better nutrition as measured by the food consumption score (see tables 5.8). This in turn improves the health of household members and positively affects their productivity during work and learning capacity of their children. This was further confirmed by the interview made with the informants. The branch managers and loan officers interviewed claim that clients are shown to consume nutritious food, send their children to school on a regular basis, type of clothing and housing is different from non-clients.

- ***Impact on household voluntary saving***

Average annual saving though low in absolute terms was found to be significantly higher for the treated clients by an amount of 3000 Nakfa (200 USD) measured using kernel and stratification methods. The mandate of the SMCP was to extend small loans and accept voluntary savings which otherwise could not be made possible by the formal banking sector. However, the institution has not yet been able to collect voluntary savings from clients. Whether there exists the capacity to save among the client households remains an empirical

question. All the interviewed panelists agree that there is the capacity to save but the culture of savings needs to be harnessed and developed. One client and village administrator reiterated that if not for lack of awareness on the benefits of savings, clients could have easily deposited small sum of money at least by selling one goat or sheep every year. Another loan officer stated:

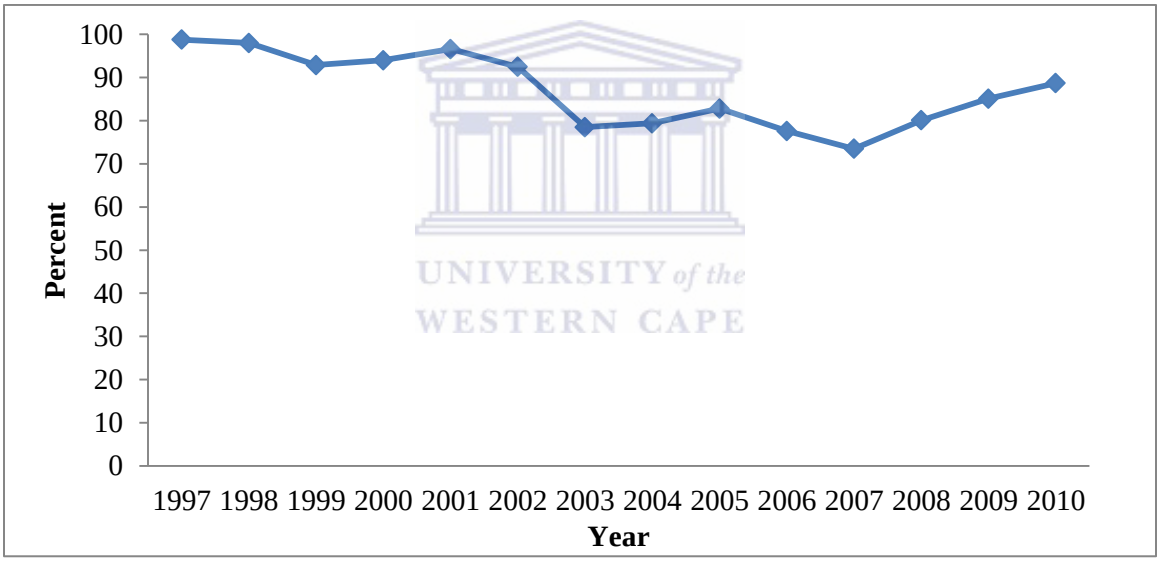
> Absence of saving facility is an issue. The SMCP does not accept voluntary saving from clients. Moreover, there is no tradition of depositing money at the bank. There is a general understanding among the rural people that money that is saved remains idle and unproductive. So they prefer to use it for purchasing livestock which is their primary saving instrument in rural areas.

The presence of inflation is also another reason for lack of saving among client households. One regional manager explained that clients are well aware of the impact of inflation on saving; therefore, instead of letting their money be diluted by inflation, they would rather prefer to invest in livestock or make small trading activities around the local markets. He further added that a rate of return on deposits which is currently two percent might not motivate clients to save. Generally, a combination of factors such as low culture of saving, non-availability of saving facilities, inflation, low rate of return on deposits contribute to low amounts of cash saving and leading instead to other forms of saving particularly livestock assets for social and economic reasons. Crépon, *et al*. (2011) concluded that an increase in livestock represents an act of saving and constitutes un-realised profits. The SMCP collects forced deposits as part of a requirement to access credit and induce repayment but the authorities also believe that forced deposits serve as a mechanism for clients to exercise and learn financial discipline and gradually practice the habit of saving voluntarily.

Table 5.12 shows the direct estimation of the impact of participation in the SMCP using propensity score matching methods. There are also indirect indicators where the SMCP authorities used to assess the positive impact of accessing credit. These indicators include high repayment rate, increase in the demand for credit by new applicants, and the number of graduates from solidarity group loan to individual loan. As far as repayment rate is

concerned, the assumption is that, if microfinance institutions demonstrate high repayment rate, it means that borrowers were able to make sufficient returns to pay their loans back and yet improve their livelihood. The logic implies that if clients were able to repay their loan with interest, they must have used it productively and the loan had positively contributed to their livelihood. However, the indicator cannot stand on its own as clients may take loans from other microfinance institutions or moneylenders to pay off their existing loans which could eventually lead to downward spiral of ever-increasing debt (Fenton, 2010). But when the repayment rate is crosschecked with other indicators, it might serve as an indicator of impact. The following figure for example indicates the repayment rate of the SMCP's clients from the year 1997-2010.

Figure 5.4: SMCP Clients aggregate repayment rate (1997-2010)



Source: SMCP (2010)

The average repayment rate over the past 14 years (1997-2010) was 87 percent. Overall, the rate was assumed to be a success for both the SMCP and its clients. As shown in Figure 5.4, from 1997 up to 2002, the repayment rate was so high (92-98 percent) owing to the good performance of the economy before the border conflict erupts. The relatively lower repayment rates observed from 2003 and 2007 were attributed to the effects of the border conflict with Ethiopia, the persistence of no peace no war situation thereafter, the recurrence of drought, inflation, and in some case lack of adequate supervision (SMCP, 2010). After, its

lowest level in 2007 (73.5 percent), the repayment rate has steadily increased and reached 88.7 percent in 2010. The main factors responsible for the outcome as reported by the SMCP were close monitoring of loan performances, innovative and flexible loan terms and conditions, high degree of management autonomy, and strong social pressure on borrowers to honor their commitments.

In order to substantiate the outcome results displayed in Table 5.12, separate questions were included in the questionnaire that addressed the treated sample respondents. These respondents were asked whether they faced difficulty in repaying their loan. In response 86 percent of them gave a negative reply. Those who reported that they faced difficulty of repayment (14 percent) indicated that low agricultural output, loan spent on wedding ceremony, existence of large family, death of family member, illness of family member, incidence of fire, pregnancy, shortage of animal fodder, marital conflict and loss of livestock were the major reasons behind the failure to repay on time. The treated households were also asked whether they perceived the rate of interest charged by the SMCP as being high, low or reasonable, and 90 percent of them reported that, the interest rate is reasonable. The SMCP charges 16 percent interest rate on a declining balance basis. The authorities believe that the rate is not sufficient enough to cover expenses of the institution, but the government highly subsidises the programme as part of its strategy to promote social and economic justice. Regarding the sufficiency of the size of the loan particularly at the first round, 56 percent responded that it was not sufficient and 42 percent replied that it was reasonable.

The responses obtained from interviews conducted with the SMCP authorities indicate that the provision of small financial resources enabled clients to initiate self-employment activities such as trading, opening up small shops, fattening livestock for sale, etc. This in turn has motivated a sense of work ethic and self-reliance on the rural people who otherwise could remain idle for the majority of the year except during the farming season. The authorities also claim that successful clients are those who optimally use the different loan products in the right way and right mix with clear ideas and articulated objectives regarding what to do with the borrowed funds. The flexibility on the use of loan funds and innovative diversification strategies carried out by the rural people are among the success factors.

The interviewed SMCP authorities observed that clients do not put all of their funds in one basket. For example, those who borrow for small seasonal agriculture purpose do not put all the borrowed funds on agriculture. They buy two or three goats or sheep alongside their agricultural activities. Some clients cultivate cash crops alongside staple crops, and others fatten livestock alongside their small business activities. The treated clients were also asked whether they felt that their livelihood had improved after being members of the SMCP as part of the strategy to substantiate the quantitative outcome indicators. Most of them (88.5 percent) agreed that their livelihood had improved while a small proportion (11.5 percent) felt that there was no change in their livelihood. Among those who reported improvements in their livelihood, 34 percent indicated increase in their profits, 27 percent improvements in their productive capacity and 11 percent increase in their microenterprise's capital.

5.4 CONCLUSION

This Chapter presents the empirical results and discusses the findings. The objectives at the outset of this study are to: (1) describe the assets owned, strategies pursued and outcomes achieved by rural households; (2) identify and examine the determinants of household participation in the SMCP in rural Eritrea; and (3) Assess the impacts of participation in the SMCP on livelihood outcomes of the targeted beneficiaries.

As a first step the socio-demographic characteristics of respondents were described using descriptive statistics. The gender composition of the respondents revealed that females slightly dominated the sample with 54.6 percent, which is a common observation in most microfinance institutions. The majority of the sample respondents (83 percent) were married. The average household size for the sample was six and for those of the treated and control households 6.6 and 5.7 respectively. The mean age of the sample respondents was 46 years and the majority (55 percent) of the sample respondents was between the age of 25 and 49 years old. This age represents the economically active age group. Using a two sample t-test, a significant difference was observed between the mean age of the treated and control groups. With regard to educational attainment, more than one-third of the sample attained primary

level of education and no significant difference was found in the average years of schooling between the two groups.

The livelihood activities and strategies of respondents were discussed using descriptive statistics. Agriculture represents the main economic activity of rural household and 85 percent of the sample respondents reported that they depended on agriculture for their livelihood, employment, income generation as well as for food production and consumption. This is expected as the Eritrean economy is predominantly agrarian and the study was conducted in rural areas. Sample respondents own on average 1.6 hectares of land and the mean difference in land holding between both groups using t-statistic was found to be significant. Cultivation of cereal crops was mainly for consumption, and vegetable and fruit production is not widely practiced in the study area mainly due to lack of irrigation facilities, and other input requirements. Livestock husbandry is a common practice and 79 percent of the sample respondents reported that they own at least one or more of the specified livestock types during the survey period.

Household assets are important not only to maintain the day to day consumption needs but also represent security in times of shocks and opportunities in times of economic expansion. In the study areas, the respondents were found to have owned mostly nondurable household utensils. Those considered as durable assets such as television, satellite receiver, DVD, VCD, cabinet, cupboard, and couches are not commonly owned by an average rural resident. Moreover, almost all respondents owned agricultural implements.

Diversification of income sources to non-farm microenterprises is a common livelihood strategy in rural areas. In the present study, the majority of the sample respondents (70 percent) reported that they owned and operated at least one microenterprise. The major forms of these enterprises include animal fattening followed by small retail shops, hawking, tea shops, small restaurants and traditional brewing. This indicates that rural households combine livestock fattening and other microenterprises as part of their livelihood strategies.
Households own a variety of assets, and pursue a mix of strategies and activities in order to achieve a particular livelihood outcome. The livelihood asset-strategy-outcome chain was

drawn from the conceptual framework such as SLA and HEPM. From a simple statistical descriptive point of view, average annual profit generated from microenterprises, average monthly food expenditure, weighted average food consumption score, average annual nonfood expenditure, average asset and livestock value, and annual average savings were found to be greater for the treated group than for the comparison group households. The difference was found to be significant using t-statistic except for savings.

The next step in the data analysis was to empirically identify the factors that determine the probability of household participation in the SMCP. Logit regression model was applied to estimate the probability of household participation. Since the dependent variable was a binary response variable, the model was found to be more suitable to estimate the likelihood of participation. The household's socio-demographic variables, programme and village characteristics were selected for the logit regression. Twenty variables were put into the regression model and 13 of them were found to have a statistically significant effect on the probability of household's participation in the SMCP. Age of the client, the size of the household, educational level of the client, business or entrepreneurial experience, livestock ownership, receipt of income from temporary employment, village access to electricity, occurrence of a negative effect or shock to the household, and positive perception of the client on mandatory deposits have a positive statistically significant effect on the probability of the household's participation in the SMCP. On the other hand, marital status of the client, loan size, loan type, and ownership of microenterprises were found to have a statistically significant negative effect on the probability of household participation in the SMCP. The necessary goodness-of-fit measures were conducted to check the robustness of the logit regression model. The model was generally found to be fit with statistically significant P-value. *Mean variance inflation* factor (VIF) was calculated and multicollinearity was found to be not a problem in the model. A *linktest* which is used to check for specification error showed that the model was correctly specified with insignificant P-value. A *Hosmer-Lemeshow test* was also done to check whether the model fits the data and the findings suggest that it did fit the data pretty well.

The final step was to estimate the impact of participating in the SMCP on selected livelihood outcome indicators. The PSM model was adopted to estimate the average impact of the treatment i.e. participating in the SMCP on the outcomes of the treated household group. The reason for choosing this model is because it is more appropriate for cross sectional data set. The PSM model involves the determination of the propensity score of the treated and comparison sample based on their pretreatment characteristics (covariates). The feasibility of the model is based on fulfilling the assumption of Common Support between the propensity scores of both groups. Thus a sufficient Common Support or balance was found between the propensity scores of both groups which made matching possible. The matching in turn allowed the estimation of the treatment effect on the treated group.

Four matching methods were used to check the consistency of the estimates. The findings suggest that the impact of participating in the SMCP on the relevant outcome indicators were found to be greater for the treated households than those for the comparison households. The difference was statistically significant as evaluated using t-statistics. The results confirm that the SMCP has a positive impact on the livelihood of rural household clients. It enabled them to diversify their livelihood strategy by engaging in non-farm microenterprises, strengthen and promote their livestock and household assets, maintain a stable consumption expenditure, improve food security as measured by average expenditure on food and food consumption scores, manage shocks and risks, etc. The findings were further confirmed by interviews made with village informants and the SMCP authorities, as well as secondary data such as the cumulative repayment rate.

CHAPTER 6

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

This Chapter presents the summary, conclusion, and recommendations drawn from the study. Descriptive and econometric methods were used to analyse the data set in view of the research problem and objectives set out at the beginning of the thesis. The findings prove that the treated households who have been clients of the SMCP for some time has shown statistically significantly higher values in the livelihood outcome indicators as compared with the comparison households. This chapter has five sections. Section 6.2 summarises the main descriptive and econometric findings. Section 6.3 draws the conclusion and the implications of the study. Section 6.4 presents the limitation of the study and section 6.5 outlines recommendations and suggests for future research.

6.2 SUMMARY

The study was sought to empirically assess and analyse the impact of microfinance on household livelihoods in rural Eritrea. In particular, the study provides answers to the following three main research questions; (1) what are the characteristic features of rural livelihoods in Eritrea; (2) what factors determine household participation in the SMCP in rural Eritrea; and (3) what is the impact of participation in the SMCP on household livelihood outcomes.

Assessing the impact of microfinance programmes as a policy intervention has a paramount significance to public policy-makers, programme managers, and funders. The provision of microfinance requires the supply of financial resources which involves opportunity costs to society in terms of not using such resources in other development projects. Therefore, evaluating the benefits of the programme in terms of whether it is improving the livelihood of the targeted population provides evidence to the concerned authorities so that an

appropriate policy intervention and correct choices would be made that warrants the allocation of limited resources to an area that delivers maximum benefits.

Eritrea is one of the least developed countries and its economy is predominantly dependent on agriculture. More than 80 percent of the population depends on agriculture for their livelihood, employment and income and yet agriculture's contribution to GDP remains small. Poverty is largely concentrated in rural areas and disproportionately affects women. It is a cumulated result of war, repeated drought, and resource limitations to tackle it. The financial sector is state owned, uncompetitive, provides basic financial services, and its impact in terms of financial deepening and breadth is limited as measured by the relevant financial sector development indicators. Moreover, for reasons of imperfect information and the associated outcomes of moral hazard and adverse selection as well as low economic activity and poverty in rural areas, the formal financial sector has not been extending finance to the rural people.

The inability of the formal banks to provide access to finance on the one hand and the objective to reduce poverty in rural areas on the other hand had motivated the government to establish the SMCP in 1996 to promote the private sector by encouraging the development and expansion of micro and small enterprises, to assist low income households and groups to improve their livelihoods. However, its impact has not systematically assessed. The SMCP provides microcredit and accepts mandatory deposits. It extends individual and group based loan and offers six loan products that are tailored to fit the socio-economics characteristics of its clients.

The literature reviewed suggested that financial sector development has direct and indirect linkages with economic growth at the macro and micro level. It mobilises savings, allocates capital, facilitates intermediation, promotes efficiency, diversify risk, encourages technological innovation and thus contributes to economic growth. However, the formal financial sector has been reluctant to serve the rural poor partly due to market failure which results from imperfect information, and partly due the socio-economic reality in rural areas. Microfinance institutions have been operating in rural areas to fill the financing gap created

by the formal financial sector. As reviewed in the literature that there are multidimensional channels through which microfinance can positively affects rural livelihood and reduce poverty.

The study adopted two interrelated conceptual approaches namely the Sustainable Livelihood Approach (SLA) and Household Economic Portfolio Model (HEPM) among alternative approaches such as Financial Sustainability Approach (FSA) and Poverty Lending Approach (PLA). SLA and HEPM have the merit of focusing on the client rather than the institution. Both approach (SLA and HEPM) assume that the household is the basic unit of analysis and owns a set of resources (physical, human, natural, financial, and social) and combines them in a certain way to achieve specific livelihood outcomes (consumption, asset possession, food security, savings, manage risks and shocks, etc.) under a given contextual environment. Within such framework, the provision of micro financial resources augments household's resources. Microfinance provides additional purchasing power, enabling households and individuals to exceed the limitation of their current economic situation.

An important assumption of the HEPM and applied in this study is that microcredit is fungible in the sense that it may be used for a variety of purposes within the households' activities. The conventional approach that assumed that microcredit can supplements the capital requirement and is used for productive investment only seems simplistic and does not consider the households' resource mobilisation and allocation decisions. Therefore, the assumption of fungibility of microcredit enabled us to comprehend how it affected the various livelihood indicators.

The study made use of cross sectional survey data collected through structured and semi structured questionnaire. A total of 500 households comprising of 200 in a treated group and 300 in a comparison group were selected through a mix of cluster and random sampling procedures. Information were collected on socio-demographic variables, client and their loan characteristics, agricultural and microenterprise information, food and non-food consumption and spending, household asset possession and livestock ownership, vulnerability and coping mechanisms as well as village level information.

Descriptive statistics were computed to describe the main features of the data. Accordingly, slightly more than half of the total sample (54 percent) was comprised of female respondents. While male respondents dominate the treated group, female respondents outweigh the control group. The mean age of the total sample was 46 years. The treated sample was slightly older on average (49 years) relative to the comparison ones (45 years) and the mean age difference was statistically significant using t-statistics. More than one-third (39 percent) of the sample respondents completed their primary school with the mean level of education being three years and no statistically significant difference was found between both groups. More than three-fourth of the total sample were married and on average a household has six individuals in the family. Households in the treated and control groups have 5 and 6 members respectively and the mean difference between both groups found to be statistically significant using t-statistics.

By way of answering the research questions and addressing the research problem, the study seeks to achieve three objectives. The first objective of the study was to describe the livelihood features practiced by rural households in Eritrea. The findings show that land and livestock ownership was common among the sample respondents. Average land holding was 1.6 hectares and farming was predominantly rain-fed with few respondents (6 percent) owning an irrigated land. Treated household own more land (1.8 hectares) than comparison. Respondents grew primarily cereal crops mainly for consumption purposes. Vegetable and fruit production was not widely practiced in the study areas. Although the treated households own more land (1.8 hectares) on average relative to the comparison households, no significant difference was observed in terms of average cereal yield production between both groups. This shows that it is the amount of rainfall rather than land size that predominantly determines yield harvest in rural Eritrea.

More than three-fourths (79 percent) of the sample respondents own livestock. More than 40-90 percent of the sample respondents own the basic household items such as bed, kettle, washing bowel, chair, radio, bucket, kerosene stove, and mobile telephone. On the other hand, only a small proportion (9-19) own television, cabinet, cupboard, satellite receiver,

couch and DVD. These assets are relatively expensive and are not commonly owned by an average rural resident. While 56 to 73 percent of the sample respondents own basic agricultural implements such as sickle, plough, and hoe, small proportion (5-20 percent) own bicycle, wheelbarrow and water pump where such assets are relatively expensive.

Households in rural areas engage not only in farm activities but also in nonfarm microenterprises for consumption, accumulation or risk mitigation purposes. In the study areas, 70 percent of the sample respondents reported that that they owned or operated microenterprise besides their farming activities. Fattening and selling livestock was the top priority for the majority of the sample respondents (50 percent) followed by trading such as small retail shop, hawking which represented 14 percent and services including snacks, teashops, bars and small restaurants, traditional brewing which in aggregate accounted for 9 percent. The findings suggest that farm households in the study areas combine crop cultivation, and livestock fattening due to the strong complementarity between the two.

From a simple descriptive statistics point of view, the livelihood outcome indicators as measured by average annual profit, average monthly food expenditure, weighted average food consumption score, average annual nonfood consumption expenditure, average livestock and household asset values was found statistically significantly higher for the treated group than for the comparison group except for the per capita saving using t-statistics. Furthermore, the value of own food production was computed using the current value of cereal crops to examine the contribution of agricultural food production to the households' food consumption requirement. The result shows that the value of own food production constituted 32 percent of the households' food budget and the remaining 68 percent had to be covered through market purchase which make them more prone to market fluctuations. The low contribution of agriculture to household food requirement could be attributed mainly to the shortage of rainfall and intermittent drought observed in the study areas. On the other hand, a food consumption score (FCS) was computed to evaluate nutritional quality as part of households' food security. The findings proved that the majority of households in the treated group (52) had an acceptable nutritional quality intake followed by 46 percent which were in

a borderline region. A greater proportion of the comparison households, (63 percent) were in the borderline and 35 percent were in the acceptable consumption region.

Among the negative events or risks observed in the study areas, crop failure stood first followed by increases in consumer prices and widespread death/disease of livestock. In terms of coping mechanisms, the treated households were found to be more diversified and more than a quarter of them used their past savings including accumulated grain stock and sold their livestock as a coping strategy and only 8 percent of them were forced to sell their labour for off-farm casual employment compared to 20 percent of the comparison households who resorted to the same strategy.

The second objective of the study was to identify and analyse the factors that determine households' participation in the SMCP. The dependent variable was a binary response variable assuming the value of '1' if the household is an established client (participant) of the SMCP and '0' otherwise. A logit regression was run to estimate the effects of the explanatory variables on the probability of the household's participation in the SMCP. The explanatory variables included categorical, binary, and continuous variables. Twenty explanatory variables were selected for the logit regression based on theoretical and empirical literature of which 13 variables were found to have statistically significant effect on the probability of the household's participation in the SMCP. Age, household size, level of education, livestock ownership, entrepreneurial experience, temporary employment, village access to electricity, occurrence of negative events, and the positive evaluation of mandatory deposits were found to have a positive and statistically significant effect on the probability of participation. On the other hand, married households, amount of first loan provided by the SMCP, group based loan type, and microenterprises ownership have statistically negative effects on the probability of participation. The marginal effect was computed to evaluate the marginal contribution of a one unit change in the explanatory variables to the dependent variable.

The final objective of the study was to assess the impact of participating in the SMCP on the selected livelihood indicators. Assessing the impact of a particular intervention requires the estimation of an outcome that could have been observed for programme beneficiaries after

controlling the potential confounding factors. The construction of the counterfactual that resembles in terms of characteristics to the ones who receive the treatment intervention remains a challenge in impact evaluation studies. A propensity score matching model was employed to empirically estimate the impact of participating in the SMCP on the indicators selected. The model was chosen because it is more relevant for a cross sectional data set. The PSM involves the estimation of the propensity score and matching comparable subjects to see the difference in the mean outcomes between the two groups based on two assumptions: the Conditional Independence Assumption and the Common Support or Overlap Condition.

The propensity scores were estimated using a logit regression based on observable explanatory variables which included socio-demographic, programme and village variables that determined household participation in the SMCP. Sufficient overlap or common support which indicates the comparability of characteristics between the treated and comparison groups was found which made matching and impact estimation possible. In order to reduce the bias that arises from the exclusion of non-observable characteristics in the model, the comparison sample were made to represent new households who were either in the process of waiting response for their application or received loan before three months prior to the survey. Moreover, the use of the same data collection instruments for the treated and control groups, the selection of sample respondents from rural areas that exhibit the same livelihood features, the incorporation of as many observable variables as possible that could influence both participation and outcome, the use of matching with replacement and more comparison household samples relative to treatment group samples were potential justification for the robustness of the PSM results and are expected to reduce biases inherent in nonexperimental study designs.

Four matching methods (nearest neighbour, radius, kernel and stratification) were applied that made use of the propensity scores and the average treatment effect on the treated (ATT) on the relevant livelihood indicators was estimated accordingly. Annual profit from microenterprises, asset and livestock values, food and non-food consumption expenditures were found to be on average higher for the treated group than for the comparison group across all the matching estimators and the mean difference was found to be statistically

significant using t-statistics. Saving was found significantly higher using kernel and stratification matching.

6.3 CONCLUSION

The study concludes that the SMCP (a microfinance institution in Eritrea) has significant impact on the livelihood of households in rural areas. The study assumed that credit is fungible. The client households might use the borrowed funds in a multiple ways that best serve their interest and fill their financing gap. The significant impact found could be linked to this assumption. The credit could have been used for financing the capital requirement of their microenterprises or could have spent on smoothing consumption (food and non-food) which could indirectly reduce the burden on such enterprises. Given the fact that the livelihoods of the sampled households are mainly dependent on agriculture, the decision to engage in off-farm microenterprises was an attempt to diversify their income sources and ensure livelihood stability. Therefore, clients were able to establish and/or expand their microenterprises albeit small, less sophisticated in terms of technology and operation. However, from a rural livelihood perspective like Eritrea, it seems that the decision to diversify is driven by a survival strategy rather than an accumulation option.

The values of assets particularly livestock values were found to be significantly higher implying that microcredit from SMCP could have enabled either to add new ones or sustain the existing livestock by purchasing forage for feed and other inputs such as animal medicine. During drought where natural pasture is scarce, credit from SMCP remains the only available option to buy forage for their livestock and avoid forced sale of livestock for luck of feed. The consumption effect of credit access was also found to have positive impact on treated clients. The evidence proved that borrowing from the SMCP contributed to the food security of the treated clients as measured by expenditure on food and dietary quality represented by food consumption score as well as the non-food consumption expenditure. This attests that the provision of micro financial resources enabled households in rural areas to smooth their consumption, save their livestock, effectively manage their risks, and reduce vulnerabilities.

Overall, the evidences suggest that, the provision of microcredit not only improved livelihood, but also introduced behavioural change and transformed the mode of living and way of thinking from pure agriculture to trade and commercial activities. Furthermore, the SMCP proved to create equality of opportunity among rural households. The institution has enabled poor household to get easy access to financial resources at their doors at acceptable terms and conditions. With this access to financial resources, the poor can be able to do what the rich can do – an atmosphere of equal opportunities prevails.

Various empirical evidences from the less developed countries show that poverty has been a rural phenomenon. It disproportionately affects women, the disadvantaged group, and unemployed youth. This was the outcome of decades of urban biased socio-economic policies. One of such policies was financial exclusion of rural areas. The findings of this study thus imply that financial inclusion of rural areas through microfinance among others could have the potential to create opportunities and could enable rural people to make the best use of their available resource such as labour, land, and other local resources. It could motivate them to initiate self-employment activities, facilitate the culture of entrepreneurship, and develop a sense of self-reliance and avoid dependence on aid.

Another important implication refers to the fact that improvements in rural livelihoods could have the effect of reducing rural-urban migration and even reverse the trend and relieves the pressure in urban areas. It can also contribute to the transformation of rural areas from resource-dependent livelihoods to a diversified livelihood with a positive impact on sustainable management of natural resources and the environment. Therefore, inclusive finance through sustainable provision of micro financial resources in rural areas could promote inclusive development and socio-economic justice in Eritrea and other developing countries.

6.4 LIMITATIONS OF THE STUDY

Despite the primary data used and the relevant empirical models chosen and applied to estimate the results, the researcher realises and acknowledges the following limitations.

- The study collected information from established and new clients. Households who were once SMCP clients but dropped out for a variety of reasons were not part of the study. Therefore, if there were dropped-out or failed clients in the SMCP, the current findings may overestimate the impact of the programme.
- The model adopted in this study measured impact on a group of clients as opposed to individual clients. In practice, impact on the treated group might be different from the individual households.
- The study was conducted in rural Eritrea. Information was collected from households of different socio-economic classes. Therefore, the results of the study may not be generalised to the whole country.
- The propensity scores are estimated on the basis of the observed characteristics of participants only. The PSM model does not consider unobserved characteristics of participants as being determining participation in the treatment variable which could be noted as one potential source of bias.

6.5 RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

6.5.1 Recommendations

From the outset, the study aimed to assess the impact of microfinance on household livelihoods in rural Eritrea. Based on the findings of the study and observations accumulated during the survey, the following possible areas of intervention are recommended to optimise the benefits gained from the provision of micro-financial resources.

These recommendations could be addressed at micro, meso and macro levels. The SMCP at micro level, regional and local administrations at meso level, the national government and international agencies at the macro level could take advantage of and implement these recommendations.

The first six recommendations address to the SMCP, the regional and local administrations, the Government of Eritrea, and the last recommendation targets international development agencies and nongovernmental organisations who are keen to see livelihood improvement, poverty reduction and inclusive and sustainable development in rural areas of the developing countries.

1. Increase loan amount and funding

This study acknowledges that there is high demand for microcredit in the rural areas of Eritrea and at the same time the supply of funds is far below to match the ever increasing demand. Similarily, the amount of loan allocated for the different loan products are considered low given the current level of inflation. One reason for the deterioration of group based loan is the small amount of loan earmarked for this loan type. Therefore, additional funds are required to meet the increased demand and thus increase the loan amount allocated. The funds may come from either the central government or could be outsourced from the formal financial institutions such as the commercial banks.

2. Establishment and institutionalisation of business development services

Given the lack of an institution that provides training, information, consultation, financial literacy, etc., in rural areas, a business development service (BDS) that provides services related to business development and entrepreneurship assumes critical importance towards optimising the benefits from micro financial resources.

3. Mobilisation of voluntary saving

As livelihood improvement proceeds, clients of microfinance should graduate and exit from the institution and work on their own by replacing credit with savings. However, at the present time, the SMCP is not accepting voluntary saving. Thus, given the long-term

importance of savings over credit, the SMCP should be authorised to mobilise voluntary saving. Accepting voluntary saving will give the SMCP the leverage to increase its funds for credit. Furthermore, the collection of voluntary deposits from clients is expected to facilitate the transformation from traditional forms of saving such as livestock, jewelries, or keeping cash in the house to safe, secure, and productive accounts.

4. Provision of microinsurance in agriculture

Agriculture is the mainstay for the majority of the rural population. However, agriculture is highly dependent on weather conditions and drought has been a recurrent occurrence in rural Eritrea. Drought results in covariate risk affecting the entire community and their livelihoods. In times of drought, the productivity of microcredit could negatively affect both – the clients and the institution. Given the fact that drought is the major risk affecting livelihoods in the study areas, the government in general and the SMCP in particular should consider introducing microinsurance scheme to mitigate volatility in crop and livestock production.

5. Promotion of institutional support

Regional and local administrations can extend their institutional support for client households among others by building their capacity, expand marketing opportunities, encourage investing their resources on activities that adds value to the local economy, contributes to technology transfer, improve productivity, etc.

6. Conducive and supportive regulatory framework

The findings of this study demonstrated the potential role of microfinance in rural development. Therefore, policy makers should reinforce and motivate the establishment and expansion of such institutions through conducive and supportive regulatory framework. This could include motivating governmental and nongovernmental microfinance organisations with the objectives of poverty reduction and sustainable development to operate in rural Eritrea.

7. Step up international efforts

Setboonsarg and Parpeive, (2008) in their assessment on the impact of microfinance on Millennium Development Goals (MDG) in Pakistan concluded that the provision of microfinance has direct and indirect positive effects on the achievement of the eight MDGs. Therefore, international organisations such unilateral and multilateral donor and development agencies as well as non-governmental organisations should step up their efforts and increase their commitment of resources to the rural areas of developing countries so that our common goals and collective aspirations will be realised.

6.5.2 Suggestions for future research

For academics, practitioners, and those interested in microfinance, the following areas are suggested for future research:

- The PSM model is a partial equilibrium analysis focusing on the impact of the intervention on the borrowers themselves. Therefore, further research is required to examine the spillover effects of microfinance including on non-borrowers applying a general equilibrium analysis.
- This study argues, microfinance has a positive impact on rural livelihoods. However, to assess its poverty reducing effect requires further empirical investigations involving a sample of poor households only.
- There is an ongoing debate on the issues of financial sustainability vs. outreach of microfinance institutions. On the one hand, the objective of microfinance is to expand their outreach to the poor, disadvantaged group, remote rural areas, and on the other hand, subsidised microfinance could not be financially sustainable. Therefore, an empirical research is required to investigate on how microfinance institutions like the SMCP could sustainably make their resources and service accessible and at the same time broaden their depth and breadth to the poor and marginalised groups.
- In attempt to cater the needs of its clients, the SMCP provides different loan products such as microbusiness loan, small business loan, small seasonal

agricultural loan, irrigated agricultural loan and oxen loan. Therefore, a comparative empirical analysis is recommended to examine the impact and relative merits of each of these loan products.

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Appendix I – Logistic regression results on the determinants of household participation in SMCP

Dependent variable [a]: Households participation in SMCP (Binary)			
Independent variables	**Odd Ratio**	**Standard Error**	**P- Value**
Demographic variables			
Age	1.033	0.012	0.005***
Gender (Male)	1.148	0.340	0.641
Marital Status (Married)	0.523	0.169	0.045**
Household size	1.222	0.061	0.000***
Level of education	1.086	0.045	0.049**
Socio-economic variables			
Land ownership	0.561	0.262	0.215
Land size	1.110	0.128	0.366
Ownership of irrigated land	1.197	0.587	0.714
Livestock ownership	2.254	0.776	0.018**
Microenterprise ownership	0.434	0.128	0.005***
Income source from permanent employment	0.539	0.227	0.142
Income source from temporary employment	1.643	0.453	0.072*
Income source from remittance	1.380	0.587	0.449
Entrepreneurial experience	1.023	0.011	0.044**
Exposure to negative events	2.789	0.810	0.000***
Programme related variable			
Loan size(First round)	0.732	0.021	0.015**
Loan type (Group loan)	0.411	0.126	0.004***
Perception of mandatory deposits	1.883	0.453	0.009***
Infrastructure related variables			
Village access to electricity	2.222	0.642	0.006***
Village access to roads	0.869	0.326	0.708
Number of observations	500		
Log likelihood	-268.324		
LR Chi-square (20)	136.36		
Prob > chi2	0.000		
Pseudo R^2	0.2026		

* = Significant at 10%,; **= significant at 5%; *** significant at 1%

Source: Field survey data, 2014

Appendix II - Consent form

Ph.D Study on

"The Impact of Microfinance on Household Livelihoods: Evidence from Rural Eritrea".

Consent Form

My name is Amine Habte. I am doing a Ph.D degree in Economics at the University of the Western Cape. The title of the Ph.D study is "The Impact of Microfinance on Household Livelihoods: Evidence from Rural Eritrea". The purpose of the study is to estimate and analyse the impact of microfinance services on the livelihood of households in rural Eritrea.

My contact number is 0719285568 in South Africa and 07144782 in Eritrea.

Before we begin the interview, I want to make sure you understand the following information about the study:

- Your participation is entirely voluntary. You may refuse to take part in the interview, and you may stop at any time if you do not want to continue.
- The average amount of time for this interview is about 45-60 minutes.
- You have the right to ask questions at any point before the interview, during the interview, or after the interview is completed.
- All information collected for this study will be kept strictly confidential. While the data collected will be used for research purposes, information that could identify you or your household will never be publicly released in any research report or publication.

I ……..(full name of participant) hereby confirm that I understand that the questionnaire is for a research project and that the information I give will be used towards a Ph.D degree and other academic publications.

I consent to participating in the research project. I understand that I am at liberty to withdraw from the interview at any time, should I so desire. I also understand that my identity will be kept confidential unless I give my express consent in writing. I understand that the findings of the research will be available to me upon request.

By signing below, you signify that you agree to participate in the study, and that your participation is entirely voluntary.

_____ _____

Signature of the respondent Date

Appendix III- Questionnaire

The Impact of Microfinance on Household Livelihood: Evidence from Rural Eritrea
Questionnaire

Reference:- 1= TG 2= CG

HH ID_____ Name of Respondent_____ Zoba_____

Branch _____Village_____ Name of Interviewer_____ Interview Date _____Start Time _____End Time_____

CLIENT AND LOAN CHARACTERSTICS

Is the household an established client of SMCP? 1= yes 0= no

Date joined the programme: _____ Months in the programme: _____

Number of loan client has taken_____

Amount of 1st loan_____Amount of current loan_____

Cumulative amount of all loans taken _____Current saving amount_____

Cumulative saving amount_____

Client's current loan maturity period: _____

Ratio of cumulative savings/cumulative loan _____

SOCIO-DEMOGRAPHIC INFORMATION

1. Gender of the household head: 1= male 2= female

2. Age of the household head in years: _____

3. Household head marital status: 1= married 2= divorced 3= widow 4= single

4. Years of education completed of the household head:_____

5. Household size in numbers:_____

6. How many of them are adults (18 years of age and above but bellow 65 years):_____

7. How many of them are old age (65 years and above):_____

8. How many of them are school age (6-17 years of age):_____

9. How many of them are infants up to 6 years of age?:_____

10. How many of your-school aged children currently attend school?:_____

11. How many of your school-aged girls currently attend school? :_____

12. Highest grade in terms of numbers of years in school (girls):_____

13. How many of school-aged boys currently attend school?:_____

14. Highest grade in terms of numbers of years in school (boys):_____

NON-BUSINESS INCOME

15. Does the household have any source of income other than this business? 1= yes 2= no

16. If yes, in which of the following the household earns additional income?

Code	**Source of income**	**Yes**	**No**	**Amount earned over the last 12 months**
	Permanent employment	1	2	
	Temporary (casual) employment	1	2	
	Remittances	1	2	
	Income from disability fund	1	2	
	Income from martyr's fund	1	2	
	Government support for DF members	1	2	
	Other, specify	1	2	
Total				

INFORMATION ABOUT SOCIAL CAPITAL

17. Are you a member of one or several of the following local institutions/organisation?

Code	Type of Institutions/organisation	1= yes 2= no	If yes, how long (in years)
	ROSCA (Ekub)		
	Cooperatives		
	Religious association		
	Women association (NUEW)		
	Labour union (NCEW)		
	Youth union (NUEYS)		
	Other:		

ENTERPRISE LEVEL INFORMATION (non-agricultural activities)

18. During the last 12 months, did you

operate/own one or several enterprises other than farming?

1= yes 2= no 99= don't know

19. If yes to Q18, what type of enterprise(s)?

1= trading (shop) 2= manufacturing (metal, wood work, bakery…) 3= livestock husbandry 4=Irrigated Agriculture 5= services (snack, teashops, bar, restaurant) 6= handicraft (weaving, embroidery, pottery) 7= Quarrying and Brick making

20. If yes to Q18, did your net income from the enterprise(s) during the past 12 months

1= increased remarkably 2= increased 3= remained the same 4= decreased 99= don't know

21. If yes to Q18, in the last **two months**, which of your enterprises earned the highest income? List

Enterprise 1:_____

Enterprise 2:_____

Enterprise 3:_____

22. If yes to Q18, why did you decide to open/operate this enterprise? (***more than one answer is possible***)

1= to get profit

2 = because I could not get another job

3= because I want to work independently

4= because I want to diversify my livelihood

5= because I have the skill and experience related to the enterprise

6= because I inherited it from my families

7= because income/output from agriculture is not enough

23. If yes to Q18, how did you finance the establishment of the enterprise(s)? (***more than one answer is possible***)

1= own saving 2= borrowed from friends & relatives 3= borrowed from SMCP

4= borrowed from a bank 5= borrowed from moneylenders 6= borrowed from Ministry

7= other (specify)_____

24. If yes to Q18, how many workers are employed in the enterprise(s) in the past 12 months if any?

	Male	Female
Working proprietor		
Family members		
Paid employees		

Do you have school children working or assisting in your business? 1= yes 2= no

26. Who are your main customers?

1= neighbors 2= retail shops 3= local residents 4= others; specify_____

27. Who are your main suppliers?

1= wholesalers 2= retailers 3= local market 4= others; specify_____

28. What was your estimated sales volume (cash and credit)?

Activity type	Average sales per month	Total average sales in 12 months

29. How much and what were your estimated costs for running this enterprise in the last 12 months?

Expense type	Average cost per month	Total cost in 12 months

30. What were your estimated profits after deducting your expenses and before spending on your family?

	Av. Sales-Av. cost(profit per month)	Calculated profit in 12 months
Cash		

31. During the past 12 months, did you make any of the following changes/investments in the enterprise?

Type of changes/investments…	**1=yes**	**2=no**	**99= don't know**
Added new products/goods			
Hired more workers			
Added/purchased additional livestock			
Opened new branches			
Purchase major equipment and machinery			
Purchase transport facilities			
Invested in enterprise site(buildings, storage rooms)			
Invested in electricity, water supply, telephone (mobile)			
Other:			

32. How long have you operated this enterprise (in years):_____

33. For what purpose did you borrow or applied for loan from SMCP?

1= to establish a new business 2= to expand existing business 3= both

34. How did you invest or plan to invest the loan?

1= to purchase fixed assets (equipment) 2= to meet working capital requirement

35. For which type of loan did apply or get loan from SMCP? 1= Group loan 2= Individual loan

36. For which type of loan product did you apply or get loan from SMCP?

1= Micro-Business Loan (MBL) 2= Small Seasonal Agricultural loan (SSAL)

3= Oxen (livestock) loan (OL) 4= Small Business Loan (SBL) 5= Irrigated Agricultural Loan (IAL)

37. Business Management practices….

In managing your enterprise….	**1=yes**	**2=no**	**99= don't know**
37.1 Do you keep records			
37.2 Do you have separate budget for enterprise activities and household expenses			
37.3 Do you pay yourself a wage out of your profit			

38. Is the enterprises main site the same as where you live? 1= yes 2= no

39. For what purpose did you use your sales revenue (proceeds) in the past 12 months? **(More than one answer is possible)**

Code	Type of use	Yes	No	Rank the 3 on which you spent money most	How much did you spent on each of the **three** in the past 12 months
	Re-invested on the business	1	2		
	Agricultural activities (crop/livestock)	1	2		
	Expand/maintain dwelling	1	2		
	Food for household members	1	2		
	Education expenditure for household members	1	2		
	Health and medical expenditure for HH members	1	2		
	Social obligations	1	2		
	Own saving	1	2		
	Debt or loan payment	1	2		
	other specify:				

AGRICULTURAL INFORMATION

40. What is the total surface of your rain-fed land holding? _____(hectare or tsmdi)

41. Does the Household own irrigated land? 1=yes 2=no

If yes, what is the total area irrigated?_____(hectare or tsmdi)

42. Over the last 12 months has anyone in the household participated in growing crops and livestock?

1= yes 2=no

43. If yes, what crops have the HH members been growing or cultivating in the last 12 months?									
Crop type		Did the HH grow the following items in the last 12 months		Unit of measurement	Total amount harvested	Quantity sold to the market	Quantity of money from selling	Quantity(units) given to others	Quantity (units) left for consumption
		Yes	No	Units	No of units	No of units	Nackfa	No of units	No of units
	Sorghum	1	2						
	Wheat	1	2						
	Barely	1	2						
	Millet	1	2						

	Taff	1 2						
	Maize/corn	1 2						
	Beans/Peas	1 2						
	Tomato	1 2						
	Spinach	1 2						
	Cabbages	1 2						
	lettuce	1 2						
	Potatoes	1 2						
	Carrots	1 2						
	Onions	1 2						
	Pepper	1 2						
	Total							

44. If yes, what livestock have the HH members owned in the last 12 months?							
		Has the HH owned the following livestock in the last 12 months	Numbers owned at the moment	Numbers sold in the last 12 months	Amount of money from selling	Quantity given to others	Quantity lost due to theft, illness or other
		Yes No	Numbers	Numbers	Nakfa	Number	Numbers
	Cattle	1 2					
	Oxen	1 2					
	Sheep	1 2					
	Goats	1 2					
	Donkeys	1 2					
	Mules/horse	1 2					
	Camel	1 2					
	Chickens	1 2					
	Others:	1 2					
	Total						

45. Did the HH own chicken in the last 12 months? 1= yes 2= no if no, skip to next question					
Type of product	Eggs produced per month	Numbers sold in the last 12 months	Amount of money from selling	Quantity given to others	Quantity used for HH consumption
	Numbers	Numbers	Nackfa	Number	Number
Eggs					

46. Did the HH own cattle, goats, or sheep in the last 12 months? 1= yes 2= no if no, skip to next question						
Type of product	How many months of the year did you get (…)	Quantity produced during those months	Quantity sold to the market	Amount of money from selling	Quantity Given to others	Quantity used for HH consumption
	Number of months	Litter	Litters	Nakfa	Litters	Litters
1-Milk						
2- Butter						
3-Other						
Total						

47. During the last agricultural season, did your output from agricultural activities…
1= increased remarkably 2= increased 3= remained the same 4= decreased 99= don know

48. If you had any significant changes in the yield of your agricultural production compared to the preceding season, can you indicate the causes?

49. During the last 12 months, did you make any of the following changes to your agricultural activities?

	Type of Input	**Yes**	**No**	**Amount spent**
	Cultivated additional plot for subsistence crops	1	2	
	Irrigated additional plots for cash crops/vegetables	1	2	
	Hired additional workers (including casual labour)	1	2	
	Bought or acquired fertilizer	1	2	
	Used more manure such as animal dung	1	2	
	Bought or acquired spray, pesticides	1	2	
	Bought or acquired ploughs, sickles, hoe	1	2	

	Bought or acquired seeds and seedlings	1	2	
	Bought or acquired veterinary medicine and care	1	2	
	Bought or acquired animal feed or chicken feed	1	2	
	Others:			
	Total amount spent			

Household Living standard

50. What is the type of dwelling the household occupies?
    1= Modern house made of cement, tin or tailed roof
    2= Semi-traditional house made of cement block, brick, zinc
    3= Traditional house made of wood, mud, thatching
    4= Other, specify _____

51. What is the total number of rooms that the household occupies in this dwelling?

_____

52. What is the household's main source of water

Public tap	01
Water-carrier/tanker	02
Borehole pumps offsite/communal	03
Rain water tank on site	04
Flowing water/stream	05
Well (communal)	06
Dam/pool/stagnant water	07
Other (specify)	08

53. How far is the water source from the dwelling?

Less than 100 metre	01
100m-less than 500m	02
500m-less than 1km	03
1km-less than 2km	04
2km or more	05
Don't know	99

54. Does the household have toilet facility? 1= yes 2=no

55. Does the household have electricity (connected, or installed but not connected)?
    1= yes 2= no

56. What is the main source of energy/fuel for this household for _____?

Type of energy	**Cooking**	**Lighting**
Electricity from network	01	01
Electricity from generator	02	02
Kerosene stove	03	
Wood fuel	04	
Charcoal	05	

Candles		06
Animal dung	07	
Solar energy	08	08
Kerosene/oil lump		09
LPG, gas		
Other (specify)	10	10

57. Does the household have mobile telephone?
1= yes 2=no

58. If you were to walk, how many (hours, minutes) would it take from your dwelling to reach the main road or bus station by foot? _____ (hours, minutes)

59. During the last 12 months, were any major improvements, repairs or additions made to your housing? 1= yes 2= no 99= don't know

60. If yes, indicate among the following

Type			55.5**For clients of SMCP**, were a member of SMCP when this took place	
	Yes	**No**	**Yes**	**No**
60.1 Housing repairs or improvements (such as fixed or improved roof, walls, painting,)	1	2	1	2
60.2 Housing expansion (such as built extra room, shed, kitchen,)	1	2	1	2
60.3 Installed sanitation system (such as latrines, shower)	1	2	1	2
60.4 Installed electricity	1	2	1	2

FOOD SPENDING AND CONSUMPTION (Food security situation)

61. Did the household eat any of the following food items in the **last 30 days**?

	Food item	**Was this food eaten in the last 30 days**		**Quantity from own production**	**Value used from own production**	**Quantity bought from the market**	**How much was spent on this food in the last 30 days**
		Yes	No	Quantity	Nakfa	Quantity	Nakfa
	Flour (bread)	1	2				
	Rice	1	2				
	Pasta	1	2				
	Meat	1	2				

	Lentils	1 2				
	Beans/peas	1 2				
	Potatoes	1 2				
	Other vegetables	1 2				
	Fruits (banana, orange,	1 2				
	Oil for cooking	1 2				
	Margarine, butter	1 2				
	Milk, Yoghurts and dried milk	1 2				
	Eggs	1 2				
	Sugar	1 2				
	Baby food	1 2				
	Coffee and tea	1 2				
	Other food expe	1 2				
What was the total food expenditure of this HH in the last 30 day? _____						

62. How many times have you eaten any of the following food items in the past **seven days**?

Food groups	Frequency	weight	FCS
cereals (wheat, sorghum, barely, maize, taff) & potatoes		2	
Pulses (beans, peas, lentils including shiro)		3	
Vegetables (cabbage, lettuce, spinach, tomatoes, pepper, onion…)		1	
Fruits (banana, orange, guava..)		1	
Beef, goat/sheep, poultry, egg, fish		4	
Milk, yogurt, and other diary		4	
Sugar		0.5	
Oil		0.5	
Butter		0.5	
Total Food Consumption Score (FCS)			

63. In the last 12 months, how often did any **adult** member of the household go to bed hungry because there was not enough food?

Never	01
Seldom	02
Sometimes	03
Often	04
Always	05
Not applicable	88

64. In the last 12 months, how often did any **child** member of the household go to bed hungry because there was not enough food?

Never	01
Seldom	02
Sometimes	03
Often	04
Always	05
Not applicable	88

NON-FOOD CONSUMPTION AND SPENDING

65. Does the household spent money on the following items?

code	Consumption items	56.1 Does the household spend money on this item in the last 12 months		56.2 How much was spent in the last 12 months
		Yes	No	
	Soap, Omo	1	2	
	Mobile card	1	2	
	Holidays celebration (Eid, Easter, Christ mass)	1	2	
	Ceremonies (wedding, funeral)	1	2	
	Transportation (bus)	1	2	
	Water	1	2	
	Electricity	1	2	
	Wood, charcoal, candles, kerosene, hand of light,	1	2	
	Kitchen equipment	1	2	
	Home maintenance	1	2	
	Bedding, sheets, blankets, pillow	1	2	
	Shoes and clothing	1	2	
	Health expense	1	2	
	School fees(uniform, stationary, books, registration)	1	2	
	Income tax	1	2	
	Cigarettes and tobacco	1	2	
	Beer and other drinks	1	2	
	Total expenses for the last 12 months… ……..Nakfa			

66. Which one is relevant to your household among the following options?

	It was less than adequate for your household's needs	It was just adequate for your household's needs	It was more than adequate for your household's needs
66.1 Concerning your household's food consumption over the past one month, which of the following is true?	1	2	3
66.2 Concerning your household's housing, which of the following is true?	1	2	3
66.3 Concerning your household's clothing , which of the following is true?	1	2	3
66.4 Concerning your household's health expenses, which of the following is true?	1	2	3
66.5 Concerning the schooling of children, which of the following is true?	1	2	3

HOUSEHOLD LEVEL ASSETS

67. Does the household own any of the following assets?

	Do you own this item	How many of this item do you own	Was this item acquired during the last 12 months	What value would you ascribe (if you were to sell today)	For clients only: were you a member of SMCP when this item was acquired?
	Yes No	Quantity	Yes No	Nakfa	Yes No
Radio/tape recorder	1 2		1 2		1 2
Television	1 2		1 2		1 2
Receiver	1 2		1 2		1 2
DVD player	1 2		1 2		1 2
Cupboard	1 2		1 2		1 2
Keredensa	1 2		1 2		1 2
Bed	1 2		1 2		1 2
Chair	1 2		1 2		1 2
Salon	1 2		1 2		1 2
Bicycle	1 2		1 2		1 2
Camera	1 2		1 2		1 2
Mobile phone	1 2		1 2		1 2
Kerosene stove	1 2		1 2		1 2
Plough	1 2		1 2		1 2
Sickle	1 2		1 2		1 2

Wheelbarrow	1	2		1	2		1 2
Hoe	1	2		1	2		1 2
Water pump	1	2		1	2		1 2
Kettle	1	2		1	2		1 2
Washing bowl	1	2		1	2		1 2
Bucket	1	2		1	2		1 2
Other (specify)…	1	2		1	2		1 2
Total Value of Assets							
Total Value of Assets if they are acquired while HH is a client of SMCP							

68. Does the household own any of the following livestock?

	Do you own this item		**How many of this item do you own**	**Was this item acquired during the last 12 months**		**What value would you ascribe (if you were to sell today)**	**For clients only: were you a member of SMCP when this livestock was acquired?**	
	Yes	**No**	**Quantity**	**Yes**	**No**	**Nakfa**	**Yes**	**No**
Ox	1	2		1	2		1	2
Cow/Cattle	1	2		1	2		1	2
sheep	1	2		1	2		1	2
goats	1	2		1	2		1	2
Chicken	1	2		1	2		1	2
Donkey	1	2		1	2		1	2
Mule/horse	1	2		1	2		1	2
Camel	1	2		1	2		1	2
Total value of Livestock								
Total value of livestock if they are acquired while HH is a client of SMCP								

HOUSEHOLD VULNERABILITY AND COPING MECHANISM

69. Has the household experienced any of the following negative events in the past 24 months?

		Occurrence of event	
	If no, skip to next question	***Yes***	***No***
	Serious illness, injury or death of a household member	1	2
	Widespread death and/or disease of livestock	1	2
	Major crop failure (drought)	1	2
	Decrease of remittance to household	1	2
	Theft, fire, or destruction of household property	1	2

	Increase in consumer price (inflation)	1	2
	Any other negative event (specify)	1	2

70. If yes, during a negative event, what did the household do to overcome the difficult time(s)?

1= withdrawn past saving 2= borrowed money from relatives and friends

3= borrowed food 3= sold household appliances

5= sold productive assets 6= got casual employment

7= sold jewelry 8= participated in informal petty trade

9= sold livestock

99= don't know 10= other, specify; _____

LOAN USE STRATEGIES and CASH SAVINGS

71. During the last 12 months, did you borrow money from sources other than SMCP?

1= yes 2= no 99= don't know

72. **If yes**, from which sources and how much? (other than SMCP) (***multiple answers are possible***)

Type/institution	**Amount borrowed**
ROSCA (Ekub)	
Commercial bank	
Development bank	
Government institution (ministry)	
Local NGO (women's association)	
Family member, friend	
Money lender	
Tradesmen	
Other (specify)	
Total borrowing	

73. If yes, how did you use the borrowed money?

		Yes	**No**
	Consumption (food &non-food)	1	2
	Business activity	1	2
	Loan repayment	1	2
	Other (specify)	1	2

74. Why did you use the money in this way? (*explore coping mechanism……..)*

_____

75. How do you evaluate at the moment the amount of mandatory savings paid to access SMCP loan?

1= fair 2= excessive

76. During the last 12 months did you have voluntary saving other than the mandatory saving with SMCP? 1= yes 2= no

If yes, where or how did you keep your savings?

	Place/institution	**Amount saved**
	In my house/under mattress	
	With a confidant	
	Traditional ROSCA (Ekub)	
	Bank	
	Save in the form of jewelry	
	Buy livestock	
	Other (specify)	
Total Saving		

77. If your answer for question 76 is no, then why?

1= low saving capacity 2= lack of saving facility 3= low rate of return on saving

4= difficulty to withdraw savings 5= Other, specify _____

78. Does the village have access to potable water? 1= yes 2= no

79. Does the village have access to electricity? 1= yes 2=no

80. Does the village have transportation infrastructure (roads)? 1= yes 2= no

81. Does the village have transportation services (bus, minibus)? 1= yes 2= no

82. Does the village have access to basic health services (clinic) ? 1= yes 2= no

83. Does the village have elementary school? 1= yes 2= no

84. What is the distance of the enterprise in km from the nearest market: _____

For new clients/non-client SMCP only

85. Are you aware of the existence of SMCP around your area/village? 1= yes 2= no

86. If yes, why haven't you applied for loan from SMCP so far?

1= I don't need loan

2= I have no idea what to do with the loa

3= I am afraid of not repaying my loan and going in to debt

4= I feel that there is no thriving business

5= I feel that interest rate is high

6= Loan size is not appropriate

7= Others (specify)

87. **For established clients of SMCP**, how did you use your last loan?(***multiple answers are possible***)

	Type of activity	Loan use		Estimation in % of total loan use
		Yes	No	
	On ongoing business activity(off-farm)	1	2	
	On new business activity	1	2	
	On agricultural production (crop and irrigation)	1	2	
	Purchase of livestock (Oxen)	1	2	
	Purchase of food	1	2	
	Payment of school expenses	1	2	
	Payment of health expenses	1	2	
	Purchase of clothes	1	2	
	Purchase of household appliances	1	2	
	Repayment of another loan	1	2	

88. Why did use you the loan in this way? (*to explore constraints to investing in business and meeting other consumption expenses)*

_____

_____

_____

89. **For established clients of SMCP**, do you think that your enterprise is growing after taking the loan?

1= yes 2= no

90. If no, why do you think the reason is?

1= Lack of sufficient demand

2= High price for inputs/goods

3= Lack of sufficient capital for expansion

4= Lack of complimentary business development services

5= Limited skill on the part of the owner

6= High income tax

7= Other (specify)

91. **For established clients of SMCP**, did you have difficulty repaying your loan?

1= yes 2= no 99= don't know

92. If yes, what were the causes for difficulty in repayment? List up to three major causes :

1. _____

2. _____

3. _____

4. _____

93. **For established clients of SMCP**, how do you evaluate the interest rate charged by SMCP?

1= High 2= Fair 3= low 99= Don't know

94. For established clients of SMCP, how do you evaluate the initial loan size disbursed by SMCP?

1= quite enough 2= fairly enough 3= quite small 99= don't know

95. For established clients of SMCP, how do you evaluate SMCP's repayment period?

1= quite enough 2= fairly enough 3= quite short 99= don't know

96**.** For established clients of SMCP, how do you evaluate the time and procedures required for accessing SMCP loan?

1= easy and ፋስት 2= long and complicated 99= don't know

97**. For established clients of SMCP,** what was the impact of the loan on your household's livelihood?

1= Livelihood improved 2= no change 3= livelihood deteriorated

98**. For established clients of SMCP**, what was the main impact of the loan on your business/enterprises

1= Improved profit

2= Increased production capability

3= Increased capital

4= Created jobs for others

5= No impact

6= Other, specify

99. **For established clients of SMCP**, indicate up to three things you like about SMCP:

1. _____
2. _____
3. _____

100. **For established clients of SMCP**, indicate up to three things you dislike about SMCP:

1. _____
2. _____
3. _____

101. For **established clients of SMCP**, suggestions for improvement:

_____

_____

Thank you!

Appendix IV- Proofreader's declaration

PROOFREADER'S DECLARATION

This is to certify that I, Tedros Weldemichael (PhD & MA Linguistics, BA English), in my capacity as a freelance proofreader, have proofread the PhD thesis titled ***The Impact of Microfinance on the Household Livelihoods: Evidence from Rural Eritrea***, by Amine Habte.

Signed: .....

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