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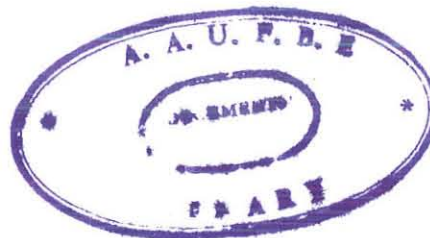
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**MICRO-FINANCE AND THE POOR: THE CASE OF
DEDEBIT CREDIT AND SAVING INSTITUTION
(DECSI) IN TIGRAY**

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A Thesis submitted to the School of Graduate Studies of Addis Ababa University in
partial fulfillment of the requirements for the Degree of Master of Science in
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ADDIS ABABA UNIVERSITY

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SCHOOL OF GRADUATE STUDIES

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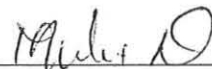
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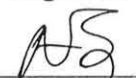

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Abstract

Currently, provision of credit is one of the major strategies being used to alleviate poverty in Ethiopia. As the Dedit Credit and Savings Institution (DECSI) is established for this purpose, the objective of this study is to evaluate the impact of DECSI microfinancing scheme to poverty reduction based on descriptive analysis, to investigate the determinants of loan repayment performance based on a recursive model, to assess the institutional viability of DECSI; and finally to investigate and collate the relevance and applicability of the Grameen Bank model to the Ethiopian condition with particular reference to DECSI in Tigray region. Primary data for the study was collected from a sample of 251(105 from rural and 146 from urban) sample beneficiaries in Tigray Region.

The results indicate that the credit scheme has made its own positive contribution (except urban sample beneficiaries related to access to educational facilities) to the beneficiaries in relation to income, access to educational facilities, medical facilities, household diet and savings in particular and to poverty reduction in general.

According to the findings, sex, level of education and size of loan for rural, urban and the whole sample cases, loan diversion rate in the case of urban and the whole sample cases, timeliness of loan disbursement in the case of rural and the whole sample cases, income from activities financed by the loan in the whole sample case and other sources of income in the case of rural sample are found to be significant determinants for full loan repayment performance as is expected. The study further found that dependency ratio and loan supervision in the case of rural, loan supervision and other sources of income in urban and the whole sample cases and size of loan in the whole sample case are significant determinants for loan diversion as expected.

In connection with applicability of the Grameen Bank model, it is concluded that it is difficult to directly apply the model in Ethiopia since the physical and socio-economic conditions of the two countries are different. Therefore, there should be some modification on the elements of the model namely; holding weekly meetings and repayment of installments, taking the bank to the people because it demands high administration cost due to the scattered nature of the dwellers in the country, particularly the rural areas of Ethiopia.

CHAPTER 1 INTRODUCTION

1.1 Background

1.1.1 Poverty in Ethiopia

Ethiopia is one of the poorest countries in the world. Although there is no comprehensive assessment of the extent of poverty in the country, available indicators show that quite a sizeable percentage of the population lives in abject poverty (Mekonnen, 1996, Trufat, 1996, Muluwork, 1997). Like several other developing countries, poverty is a major social and economic problem in Ethiopia. Yohannes (1996) noted that roughly over half of the country's population lives in abject poverty. Yohanne's report also indicated that problems of poverty are multidimensional and hence have multiple sources. "In the case of Ethiopia, poor economic performance, rapid rate of population growth, low technological base, periodic draught, and famine and internal displacement have continued to exacerbate poverty in the country."

In its ranking of countries using GNP per capita, the 1997 World Development Report of the world Bank puts Ethiopia (at 100 USD per capita) second from the last comparing it with 133 countries of the world. This fact could indicate quite a lot of things regarding the quality of life of the Ethiopian people. Over 85 percent of the total population live in the rural areas, which lacks the most basic socio-economic infrastructure and facilities. Most of the rest 15 percent, though in an urban setting, live in more or less a similar impoverished situation.

Although significant achievements have been made in the area of literacy during the last two decades, basic education is still out of the reach of the majority of the Ethiopian people. Enrollment of school-age children in primary and secondary education is only 34.6 percent and 45 percent respectively. The participation rate of girls at primary and secondary levels is low compared to that of boys. The great majority of the Ethiopian population is exposed to rampant and fatal diseases and malnutrition. The health service coverage that has reached 45 percent in 1987 E.C (Ethiopian Calendar) has remained at that level to date. Only 26 percent and 7 percent of the population has access to safe drinking water and proper sanitation facilities respectively. In consequence, the under-five mortality rate is 159/1000, which is among the highest in the world. Family planning coverage stood at only 7 percent and only 21 percent of women attend postnatal services and about 7 percent of all deliveries are attended by trained health personnel. Life expectancy at birth averaged only 53 years (MEDaC, 1999).

The issue of estimating poverty indices is another aspect of the problem (Abebe, Bereket 1996). It is indicated that "one advantage that is expected from the measurements of poverty is to inform policy makers of the status of poverty over time and across different social groups, Trufat (1996) argued that reduction of poverty requires knowledge of who the poor are, their number and the extent and severity of poverty and this is possible when poverty can be measured. In connection with this, the earliest and perhaps the most popular measure of poverty is the head-count ratio (H) which is simply the ratio of the number of the poor, q , who are defined in a certain way, to the total population in a community, n (Abebe & Bereket, 1996). They also noted that the most common way of defining the poor is to take those people who for one reason or

another are unable to secure a certain income level, called the poverty line, which may be relative or absolute in magnitude.

The other conceptual issue in the measurement of poverty is the poverty line which has served the vital role of differentiating the poor from the non-poor. In most poverty studies, the poverty line is a concept that has been treated very cautiously and so far remains operational for lack of an alternative (Abebe, Bereket, 1996). Abebe's and Bereket's report (1996) indicated that "the view among researchers about the role of the poverty line is different. Some do not accept the impression that a person shall become suddenly non-poor because he is richer by one extra dollar above the poverty line. For them, being non-poor is a process of gradation in the ladder of the income distribution. For others, the converse is acceptable. That is a person poor or not. This "either or" position has significant impact on the interpretation given to a poverty index."

According to the report by MEDaC (1999), following a period of stagnation and decline for nearly two decades, the Ethiopian economy came to a turning point in 1991 when the chapter for the protracted war closed and peace and stability reigned as a result of the demise of the Dergue. Thus, a recovery in economic performance has been registered since the introduction of the Economic Reform Program (ERP).

Among the notable measures undertaken: the government implemented Structural Adjustment Program (SAP) in 1992 such as liberalization of both the input and output markets, provisions of management autonomy to public enterprises and deregulation of the transport sector, promoting private sector development and participation in the total economy, restoring efficiency in public

resource management and reallocating public expenditures infavour of the priority sectors of primary health care and primary education.

The government has devalued currency, eliminated export taxes except that of coffee, reformed the financial sector, simplified licensing procedures, etc. Also, based on the new economic policy, the Government of Ethiopia has introduced a long term economic development strategy: Agricultural Development Led Industrialization (ALDI) which is geared towards the transformation of the backward economic structure. It is a two-pronged strategy incorporating on one side the external sector (export-led part) and on the other the internal sector which shows the forward and the backward linkages between agriculture and industry (MEDaC, 1999).

Trufat (1996) indicated that it seems necessary to include poverty alleviation program in the development strategy of the country. While reducing absolute poverty through restructuring the economy is a long term process, the transitional Government of Ethiopia has already taken some important steps to alleviate poverty through safety nets, a social rehabilitation fund and by shifting resources toward providing basic social and economic services. To alleviate rural poverty the government uses two strategies:

- provisions of food and farm input subsidies, credit for the purchase of oxen and free provision of hand tools and seeds; and
- identification and implementation of rural projects, which can generate employment opportunities in the short term and at the same time, contribute to future economic growth.

- Policy makers, however, believed that the implementation of these reforms and development strategies would result in better macroeconomic performance and growth with gradual reduction of poverty and, in fact, following the introduction of SAP and associated policies. A report compiled by MEDaC (1999) showed that over the five-year period (1992/93 to 1997/98) real overall GDP growth averaged 5.5 percent.

Although the reform programs and policy changes resulted in economic recovery and growth in GDP, the achievement towards eradication of poverty was not satisfactory in the cited years. This is because of the fact that without ensuring adequate private sector activities, thereby creating higher employment opportunities, it is difficult to reduce the existing unemployment problem in the country (Berhanu, 1999). Abebe and Bereket (1996) noted that poverty alleviation might take either the form of direct transfers or a series of interventions that may increase productivity of the poor. It may thus happen that targeting of the rural poor without recourse to intra household inequality, community level links and other issues may turn out to be futile.

- ✓ Due to unemployment problem in the country, to support their living, a lot of such people have joined the informal sector by opening small shops or business premises near their residential areas. Informal sector consists of those enterprises engaged in various business activities of which the majority are without having license for their business operations (Bekele, 1996). The informal sector has no access to formal credit and it lacks the necessary resources for its operations. It can not easily obtain credit for the acquisition of investment items and to meet working capital requirements. The same report noted that lending to the informal sector is one of

the challenges facing financial institutions and this is very much related to poverty alleviation.

Thus enabling the poor to generate income based on his/her own effort by providing credit became the most sustainable approach and based on this approach the idea of micro-finance institutions came into realization.

According to a study made in West Africa, urban migration and high population growth rates have made unemployment a critical problem for developing country governments; and donors have responded by financing the programs that develop micro-enterprises, which are meant to absorb a portion of this excess labor. The study also explained that the failure of structural adjustment to sift economic benefits down fully to the poor has alarmed governments and development experts. The study then argued that the remedy has been to create enterprises with an emphasis on raising and stabilizing incomes, particularly among the self-employed poor. The small but growing number of micro-finance institutions that have proved capable of both reaching large numbers of poor people and attaining a high level of financial sustainability has fed hopes that micro-enterprise development can make a substantial difference in the fight against poverty. (Fidler and Webster, 1996). 6

1.1.2 Credit Schemes in Ethiopia

Dejene (1999) reported that the credit need criteria takes it for granted that finance is a bottleneck in rural development and, thus, it suggests that credit is the only means for breaking the vicious circle of poverty. This idea has become so pervasive that many NGOs and donors attempt to pump financial resources into village economies without first identifying and

prioritizing the actual felt needs of small holders.⁴ He noted that there is no wonder that supply driven credit is characterized by widespread credit substitutions, credit diversion and defaults as can be witnessed by the performance of various credit schemes implemented in rural Ethiopia. Dejene's report listed four types of credit problems of rural finance in Ethiopia. These are problems of saving mobilization, weakness in the credit delivery system, default problems and inaccessibility of formal financial intermediaries like banks.

✓ The principal sources of finance for utilizing and developing ones resources are the formal and informal sectors. Relatives and friends, private moneylenders, traders, pawn brokers, and the rotating saving and credit associations are the major sources of the informal sector. The formal sector comprises mainly commercial banks, specialized development banks and cooperatives. Also, some countries have already developed an unconventional approach (semiformal institutions) to finance small farmers. These rural innovative approach are widely referred to as group lending schemes and experiences to date show they could, among others, increase access to institutional credit; improve loan recovery; and reduce transaction costs. These rural credit schemes are primarily designed to increase access of small farmers particularly the rural poor, men and women alike, to institutional credit for both agricultural and non-agricultural activities. Credit delivery is actually targeted to individual small holder using the group as guarantee. Such schemes are usually organized and sponsored either by private rural banks or governments through development banks or development projects (Tesfaye, 1993). Below, a brief review of how the different financial sectors operate in terms of extending credit to low income households is presented.

a) The Formal Financial Sector

The formal financial sector in most countries is comprised of the nation's Central Bank, the banking sector and non-banking financial institutions. The banking sector includes commercial banks, cooperative banks, development banks and saving banks. Non-banking financial institutions include government departments and statutory agencies, leasing companies, insurance companies etc. (Thillairajah, 1993).

In Ethiopia, the formal financial institutions that are actively involved in financial resource mobilization and allocation are the Commercial Bank of Ethiopia (CBE) and the Development Bank of Ethiopia (DBE). The CBE is currently faced with problem of excess liquidity while a conceivable demand for credit by poor households remains unsatisfied. The operation of the DBE has been constrained by very low loan recovery and huge losses for the last two decades. Dejene (1993) and Solomon (1996) indicated that formal financial institutions do not deliver credit as and when needed without elaborate paper work, bureaucratic lending procedures, and stringent collateral requirements. They also operate at high transaction costs. Consequently, the contribution of these banking institutions to national economic development has remained grossly inadequate.

Dejene (1993) reported that the financial intermediations in Ethiopia during the previous regime were highly biased in favor of the socialist sector of the economy. He indicated that the loan interest, for example, was 7 percent for individual farmers and private enterprises and 6 percent for state and collective farms. Also, most of the agricultural loans of the AID Bank (currently

DBE), 89 percent were made to go to state farms which accounted for not more than 5 percent of the total agricultural output, while the private peasant sector received an insignificant amount of loans. Thus, he noted that the credit policies of the previous regime had contributed to limitations in the farm household's access to formal sources of credit.

✓ Solomon (1996) noted that for the most part, the banks serve big businessmen and do not regard poor households as bankable. Many, small credit-worthy businessmen, with their viable investment ventures, are denied access to institutional credit because they could not afford the required collateral. He also indicated that, overall; the prevailing operation of the formal financial institution in many low-income countries such as Ethiopia is inefficient in providing sustainable credit facilities to the poor.

✓ Imperfect information and imperfect enforcement of loan contracts are two major sources of high loan default costs of formal credit in many low income countries (Khandker, Khaily and Khan, 1995). Thus, even if financial institutions are allowed to set their own interest rates as suggested by a number of studies, the imperfect information literature argues that this would not necessarily improve the loan recovery rates, and targeted credit programs would not reach the target households even if the price of loan is right (Hoff and Stiglitz, 1990).

Stiglitz (1990) has identified that formal lending institutions and local moneylenders have not only managed to coexist, but also the local moneylenders seem able to continue to lend at high interest rates. Although the formal lending institutions often have suffered large losses, the local moneylenders have not only survived, in some cases they have actually thrived. Part of the

reason for the survival of local moneylenders is that the formal institutions have not made loans available to all farmers who would like them (or have not provided them with as much credit as they would like). Another part of the reason may be that the local moneylenders have one important advantage over the formal institutions: they have more detailed knowledge of the borrowers. They therefore can separate out high-risk and low-risk borrowers and charge them appropriate interest rates; and they can monitor the borrowers more effectively, making sure that the funds are used productively and thus lowering the default rate.

Credit is necessary to purchase seeds, fertilizers, chemicals, consumption goods, and other inputs which help the beneficiaries to raise their production and incomes in order to improve their living conditions. However, credit in many cases is either very expensive or unavailable at any price for low-income households and this makes it difficult to improve their living conditions. In its absence, the poor households can not get the means by which they can utilize their resources and in their desperate need for finance they will be forced to depend on traditional sources of credit that require exorbitant interest rate.

b) The Informal Financial Sector

Informal finance may be defined as the totality of legal financial activities and transactions which are not, however, recorded and regulated and which fall outside the sphere of the official financial institutions (Thillairajah, 1994). Thillairajah has also noted that "the informal financial sector seems to be the major sources of rural savings and credit in Sub-Sahara African Countries. Some research studies indicate that there is great potential in Sub-Sahara African Countries for increasing resource mobilization in rural areas to meet the increasing credit demand of farmers

and micro-enterprise, and that it should be possible to reduce transaction costs significantly to enable rural savings and credit scheme to be operated viably. From the study, it has identified that many Sub-Saharan African Countries have an active informal financial sectors which provide financial services, savings, money-lending, money-keeping, etc. to households, farms, and off-farm micro-enterprises -serving constituents that formal financial institutions find unattractive."

In Ethiopia, the informal credit sources constitute essentially relatives and friends, traders, moneylenders, Rotating Saving Club (RSC). Compared with the formal financial institutions, informal lending is by far the most important source of finance for the urban as well as the rural population. Solomon(1996) has noted that in recent years, the informal sector has continued to assume increased prominence mainly due to the excessive rules and regulations of the formal financial sector. Informal sector transactions are conducted on the basis of trust and intimate knowledge of customers.

According to the general Agricultural Survey of the Ministry of Agriculture (MOA), on average, 80 percent of the rural credit requirement is met by the informal financial sector, of which friends and relatives account for nearly 80 percent. Friends' and relatives' loans are mostly interest free, though interest charges of other sources could vary from 50-200 percent. The utilization of the informal credit shows that close to 50 percent is used for consumption, clothing and medical; about 21 percent for social and other obligations; and, the remaining 29 percent for productive purposes such as for the purchase of agricultural inputs (Tesfaye, 1993).

The most popular and widely spread social and economic traditional associations which have a significant role in informal credit and saving mobilization in Ethiopia are Idir, Equb and Mahaber. The Idir is an informal financial and social institution that is almost ubiquitous throughout Ethiopia (Dejene, 1993). Its primary purpose is to provide mutual aid and financial support under emergency situation. It is mostly popular in urban areas and the common fund is deposited in the bank. Other forms of idir such as community idir and office (work-place) idir participate in various developmental activities. The Gurage Road Organization as Dejene has stated can be cited as an outstanding case of an informal organization capable of raising a large sum for investment. Mahaber usually includes regional associations, church associations and other mutual aid associations.

Bekele (1996) has identified that the majority of Ethiopia's poor are those people living in the rural areas engaged in subsistence peasant agriculture and also the major category of the poor are those individuals and households in the informal sector whose income are insufficient to provide their basic needs. On the other hand, the informal sector entrepreneurs face the problem of access to credit. Formal credit is virtually inaccessible to them because they can not provide adequate collateral. This very report argued that in the informal financial markets accessibility to moneylenders is limited and often available only at exorbitant interest rates as compared to the borrowing rate of the formal financial institutions. As a result, he argued that the profitability of the business carried out on borrowed fund is affected.

/As explained above, many of the poor in the country operate within the informal sector, and for those the problem of lack of access to financial services is particularly acute. The need for

institutional credit is therefore becoming increasingly important to enhance the low-income household. The growing recognition of the importance of providing small scale, accessible credit and other financial services, which are designed to meet the needs of the poorest with little or no collateral has thus led to the establishment of a wide range of credit programs and micro-financial institutions around the world including Ethiopia.

c) An Overview of Micro-Finance Institutions in Ethiopia

As in most developing countries, the bulk of the poor in Ethiopia live in rural areas. Urban poverty has been also on the rise for the past so years in the country. In attempts to pull households from poverty it is believed that provision of credits, particularly to poor urban households, could play an important role. If such households have capital to start or expand small businesses, they can create additional self-employment almost immediately and experience vital increases in income (Solomon, 1996).

Dejene (1999) has noted that: "the formal financial sector has failed to reach the rural poor, who account for the bulk of the population. Bank branches are limited to urban poor. Only 2 percent of the total farm household deposit their money with commercial banks." Thus, micro-financial programs and institutions have emerged because of the fact that the poorest population has little or no access to formal credit institutions.

"The factors that explain this little or no access to formal credit institutions are of both supply and demand. On the supply side, high transaction costs generally inhibit micro-enterprise access. High transaction costs are largely the result of the high unit cost of administering small loans to a highly dispersed and possibly illiterate clientele and a formal credit history. Formal lenders thus have strong incentives to favor large, more accessible clients. On the demand side, micro-enterprise operators access to formal credit has been constrained by high collateral requirements of risk averse lenders, high borrower transaction costs such as transport cost, bribes, etc., the limited education that makes application procedures difficult, social and cultural barriers, and the nature of their work. These constraints, some of which are strictly gender-related, are worse for women"(NBE, p.6, 1996).

Consequently, the poor were forced to turn to traditional moneylenders who loan at exorbitant interest rates, the payment of which restricts the poor's comparative advantage and keeps them under the spell of perpetual poverty (Micro-Finance Development Review, 2000)

After the country was hit by repeated drought, some donors in addition to relief measures that were being undertaken on grant basis have introduced some credit elements in the rural areas. These credit activities are usually in the form of oxen and seed loan. Mengistu (1997) has listed Relief Society of Tigray (REST), Ethiopian Relief Organization, Redd Barna (Norwegian NGO), National Women's Association for Development, Action AID-Ethiopia, and Village Academy as examples among the few NGOs that conduct credit provision schemes.

As explained above, the bulk of the poor in Ethiopia are denied access to institutional credit though it is a simple fact that one way to eradicate poverty as well as to achieve food security is the provision of financial services to the rural poor as well as the urban poor. Cognizant of this state of affairs, many micro-financial institutions the world over like the Grameen Bank, Bangladesh Advancement Committee (BRAC), Indonesia's Bank Rakyat Micro-financing,



Kredit Kecamatan Program (Indonesia) are engaged in the provision of small size loan to poor people. These types of institutions are known as micro-finance institutions (MFIs).

Since the demand in Ethiopia for rural financial services by the poor is significant, efforts are being made to build sustainable micro-finance institutions that reach a large number of poor households, who were not served by the limited traditional financial institutions. This has become a prime component of the new development strategy of Ethiopia (Micro-Finance Development Review, 2000)

Wide scale micro-financing started in Ethiopia in March 1990 following the signing of credit agreement between the Government of Ethiopia and the International Development Association (IDA) “to improve infrastructure in towns considered market and service centers for the agricultural hinterland and to alleviate problems of urban poverty” (Mengistu, 1997).

The micro-financing scheme under the Market Towns and Development (MTDP) was firstly planned to be implemented in sixteen towns (excluding Addis Ababa) and the coverage has increased to 59 towns up to now. Under the scheme IDA delivers credit to the Development Bank of Ethiopia (DBE) at 6% interest rate and DBE is responsible for extending credit facilities to micro-enterprises at the prevailing market rate. The concerned Regional Trade and Industry Bureau are responsible for promoting, organizing and screening micro-enterprises for the credit scheme and for specifying tasks which need specialized and trained personnel in the field. The question that arises here, however, is whether these offices have the institutional capability to carry out such tasks (Berhanu, 1999).

The Market Towns Development Project Micro-financing is group based credit scheme. Under the scheme households with a monthly income of less than Birr 100 and who voluntarily organize themselves in-groups of five are considered eligible for loans. Four to six groups form a cooperative and the Zonal Trade and Industry Offices organize and license these micro-enterprise cooperatives. The offices prepare business plan for each borrower in a cooperative. Then the business plans and other relevant documents are submitted to the Development Bank of Ethiopia (DBE) for loan disbursement (Berhanu, 1999).

✓ In Ethiopia, as more and more NGOs went into micro-financing activities, the government saw the need of regulating this activity and enacted a proclamation number 40/1996 to provide for the licensing and supervision of the business of micro-financing institutions. This proclamation also empowers the National Bank of Ethiopia to license and supervise micro-financing institutions and, to this end, to issue relevant directives.

Based on the proclamation, the purpose of micro-financing institutions, among others, includes provision of credit, accepting savings as well as demand and time deposits, drawing and accepting drafts payable within Ethiopia, providing counseling services to its clients, encouraging income generating projects for urban and rural micro-operators, managing funds for micro-financing business and borrowing money for its business purposes against the security of its assets or otherwise. The conditions that are required to engage in micro-financing business are to obtain a license from the bank, to form as a company, to deposit the minimum initial capital required by the bank; and to see to it that the directors and other officers meet requirements set by the bank.

As pointed out earlier the proclamation that provides for the establishment of micro-finance institution was issued in 1996. Since the issuance of this proclamation, sixteen micro-finance institutions have been licensed and are providing micro-finance services for more than 500,000 clients.

These are the following

	<u>Name</u>	<u>Paid-up Capital</u> <u>(Birr)</u>	<u>Legal Register</u>
1.	Amhara Credit & Saving Institution (S.C.)	500,000	09/04/97
2.	Dedebit Credit & Saving Institution (S.C.)	1,000,000	28/04/97
3.	Oromia Credit & Saving Institution (S.C.)	5,000,000	04/08/97
4.	Omo Micro-Finance Institution (S.C.)	500,500	01/10/97
5.	Specialized Financial and Promotional Institution (S.C)	200,000	25/11/97
6.	Gasha Micro-Finance Institution (S.C.)	200,000	10/05/98
7.	Wisdom Micro-Finance Institution (S.C.)	200,000	17/06/98
8.	Sidama Micro-Finance Institution (S.C.)	200,000	27/07/98
9.	Asser Micro-Financing (S.C.)	200,000	08/10/98
10.	Africa village Financing Service (S.C.)	200,000	01/12/98
11.	Buusaa - Gontaa Micro-Financing (S.C.)	213,000	17/5/99
12.	Poverty Eradication & Community Empowerment Micro-Financing (S.C)	200,000	18/11/99
13.	Meket Micro-Finance Institution(S.C)	200,000	16/12/99
14.	Addis Credit & Saving Institution(S.C)	517,000	27/01/00
15.	Meklit Micro-Finance Institution(S.C)	200,000	16/02/00
16.	Eshet Micro-Finance Institution(S.C)	225,000	15/03/00

Source: National Bank of Ethiopia: April, 30, 2000

Besides, in order to improve access to information and facilitate experience sharing among micro-finance practitioners, policy makers, donors and the public, and build local capacity and expertise in the sector, a network called Association of Ethiopian Micro-Finance Institutions (AEMFI) was established on June 28,1999.

All of these institutions have got their inspiration from Grameen Bank. They require no collateral and they encourage peer pressure as a mechanism for ensuring timely repayment of loans. Borrowers, though poor, are required to save some cents on a daily basis.

The main objective of these microfinancing institutions is to create opportunities for self employment for vast unutilized and underutilized manpower particularly in rural areas who constitute a large majority of the population, eliminate the exploitation of the grassroots poor entrepreneurs by the informal moneylenders, and inculcate banking and saving habit among the poor. Accordingly, in a very short period of time, these micro-financing institutions have managed to reach a sizable portion of the rural and urban poor and in so doing have gained significant experience (Wolday, 1999).

These institutions are proving that the poor in Ethiopia are bankable. For example, as of September 1999 :

"Dedbit Credit and Saving Institution is reaching 214,000 clients, Amhara Credit and Saving Institution 112,000 clients, Omo Micro-finance Institution 35,000 clients and Oromia Credit and Saving Institution at about 25,000 clients. In addition, the Sidama Micro-finance Institution has about 10,000 clients and the Specialized Financial and Promotional Institution and Asseer Micro-finance have reached 1,300 clients each (Wolday, 1999, p.3)"

In spite of the above success in terms of outreach and number of clients, micro-finance institutions are still facing challenges such as loan losses, weak management information system, limited capital, problems related with entrepreneurial quality of clients, limited technical and banking skills of staff, a poor perception or impression of the community that credit disbursed by government and NGOs is not collectable or could be deferred and very limited research towards

improving the sub-sector among others. Moreover, there were no forums to discuss these problems and share useful experiences of micro-finance institutions (Wolday, 1999).

Dejene (1999) has noted that “none of these micro-finance institutions has involved majority shares by the private sector. Virtually all of them are set up by regional administrations and NGOs. In other words, they are heavily subsidized and the extent to which they could be sustainable is under question.”

One of the largest micro-finance institutions in the country is Dedit Credit and Saving Institution Share Company (DECSI). This institution is fully operating in Tigray region. Tigray is one of the poorest regions in Ethiopia, with over 83% of the 3.4 million¹ populations dependent on subsistence agriculture. The Relief Society of Tigray (REST), which is a domestic NGO has been undertaking several development Programs in Tigray for more than two decades. REST, recognizing the fact that formal financial institutions have played very little part to support the development effort of Tigray, and conducting a survey and establishing the credit needs of the region, created the Rural Credit Schemes of Tigray (RCST) in 1994 as one of its development programs (DECSI, 1999).

The target group of the scheme was the rural poor of Tigray. Accordingly, the scheme continued providing easy access of credit and saving services to the poor until March 1997. The scheme was very effective in reaching the target group and alleviating poverty. But when the scheme's operational coverage and client outreach was increasingly widened, institutional restructuring

¹ Source: Central Statistical Authority (CSA)

became indispensable. The Rural Credit Scheme was thus required to be registered under the National Bank of Ethiopia that was allowed by law to form micro-financing institution. Accordingly, the Rural Credit Scheme was changed into a new institutional form under the name "Dedebit Credit and saving Institution S.C" or, for short, DECSI since March 1997. The Shareholders are the Women's, Youth's, Farmer's Associations, REST and the Regional Government. The organizational arrangement is similar to other rural banking practices especially that of the Grameen Bank (DECSI, 1999).

DECSI has the following specific objectives.

- To enhance agricultural production through providing credit for agricultural production
- To promote sales of agricultural output
- To promote saving and credit
- To stimulate the local economy
- To reduce the exploitation of the local community by the local money lenders and;
- To promote income diversification and generation of the poor.

To accomplish its objectives, the institution has different management bodies including the Shareholders, General Meeting, the Board of Directors, the General Manager, and the Auditors.

As of September 1999 the institution had 12 branches and 109 sub-branches² distributed throughout the four administrative zones of Tigray (see Appendix 1). All loans are processed and approved and savings mobilized at the sub-branches level (DECSI, 1999).

The target groups of DECSI are the rural and urban poor who are currently not catered for by the existing conventional banking institutions. The institution provides credit and saving facilities to its clients. The credit facilities include regular loans and agricultural loans. Regular loans are given to regular clients who are selected by the credit and saving committees and remain permanent clients until they graduate from the institution voluntarily. These clients can engage in any productive activities they prefer and they are within a close follow up of the institution's staff. On the other hand, agricultural input loans are provided for the purchase of agricultural inputs such as fertilizer, improved seeds and pesticides. The clients are not also forced to save and therefore they are special clients of the institution. As a result, this research concentrates only on regular loans since the input loans are not repeated permanent loans.

Both the regular and input loans follow group based lending mechanism. In the case of regular loan, borrowers are from group of five to seven members, and this group is the basic unit. The maximum loan amount for regular loan is Birr 5,000 and the minimum is Birr 50. The duration of the loan is one year (DECSI).

² Source: DECSI, 1999

The other facility provided by DECSI is saving mobilization. There are three types of savings, namely;

- Group savings: this constitutes a group tax of 5 % of all regular loans disbursed and a group members' monthly contribution of one Birr. This saving serve as a collateral for loans taken by the group members
- Center saving: constitutes each center members' monthly contribution of one Birr. Both group and center savings are compulsory.
- Individual saving: is a voluntary saving deposit of any individual or organization.

In addition to the financial services, DECSI currently is providing non-financial services like pension payment. As regards interest rate, DECSI currently charges a commercial declining rate of 12.5 % per annum on all loans and pays the minimum rate (6%) on deposit.

d) The Grameen Bank and its Application in Ethiopia with Particular Reference to DECSI

Historical Development

The Grameen Bank is a rural bank that provides credit to the rural poor, particularly, women, who own less than half an acre of land or whose assets do not exceed the value of one acre of land. The Grameen Bank loans need not be secured by collateral and this serves those who are left out of the conventional banking system. It was initially initiated by Dr. Muhammed Yunus,

in 1976 as a research project. The aim of the project was to test the hypothesis that if financial resources are made available to the poor at reasonable terms and conditions, they can generate productive self-employment with out external assistance (Hossain, 1988, p.23).

With the success of the pilot experiment, the project was replicated in five districts of Bangladesh during 1979-1982, in collaboration with rural branches of commercial banks and agricultural development bank (BKB), and with financial assistance from the Bangladesh Bank and the International Fund for Agricultural Development (IFAD).

The project was transformed into the Grameen Bank, a specialized financial institution for the rural poor, by a government ordinance in September 1983. This ordinance provided an authorized capital of TK (Bangladesh currency) 80 million and paid-up share of TK 30 million, and an ownership pattern of 60 percent with the government and 40 percent with the borrowers (Hossain, 1988). By 1994, the Grameen Bank served half of all the villages in Bangladesh. Its total membership was over 2 million; of whom 94 percent were women (Khandker et al., 1995).

The Grameen Bank is widely recognized as one of the very few successful rural credit institutions and has attracted the attention of a large number of countries and international donors. There is a widespread interest in trying the Grameen Bank approach to credit in other countries. Accordingly, the Grameen Bank model of credit delivery mechanisms was employed in Tigray in 1994. But can the Grameen Bank model be directly applicable in Ethiopia with particular reference to DECSI? This is the issue that will be addressed in this section. To address this issue, the institutional framework, credit delivery mechanism, targeted clientele,

and financial services provided by the Grameen Bank are analyzed. Since the historical development of DECSI has been explained elsewhere above, further discussion is not necessary in this section.

Organizational Structure

The Grameen Bank has four administrative levels, each with a distinct set of functions: the head office, the zonal office, the area office and the branch. The zonal offices and area offices together are referred to as the regional offices. The zonal office is a mini-head office, which makes all administrative decisions except major disciplinary actions against any staff. By contrast, the head office is more involved in providing training and raising loanable funds and grants from external sources. The branch is the field-level office. Thus, the structure is set up as head office-zonal office-area office-branch. DECSI's organizational structure currently is designed as head office-branch-sub-branch system.

The activities accomplished by the different administrative levels in both institutions are almost similar except the zonal office in the case of the Grameen Bank, which is working as a mini-head office. The lowest administrative units, which are the branch (Grameen Bank) and sub-branch (DECSI) in both institutions are the most important units in their operations and are considered as the income-making unit.

Objectives

The objectives of Grameen Bank are to provide credit and other financial services to the rural poor to enable them to improve their income and employment status through entrepreneurial activities, to help especially women to enhance their asset entitlement, economic power and social status and to build socio-economic infrastructure and instill financial discipline in the poor as well as increase its own financial strength.

On the other hand, the objectives of DECSI are to enhance agricultural production (promotion of food security), to create market outlets, to reduce exploitation of the people from local moneylender; and to create job opportunities and reduce unemployment. In both cases, the target of their objectives is to help the poor in generating income as well as self-employment on respective economic activities.

Credit Delivery Mechanism

The Grameen Bank uses group based delivery mechanism. Individuals take the first step in the banking process by organizing themselves into groups of five like-minded people of similar economic status who have mutual trust and confidence, but who are not related. Men and women form separate groups in accordance with the socio-cultural norms of rural Bangladesh. Before disbursement of any credit, the candidates are first obliged to participate in a group-training program, which is a minimum of seven days of continuous instructions on the rule and obligations of Grameen Bank. Male and female members form separate groups that are not

members of the same village and are federated into a center and the weekly meetings are held at the center level.

Each group elects a chairperson, who is responsible for the discipline of group members, and a secretary, and these positions rotate among members on a yearly basis so that all members have the learning experience that accompanies the responsibilities of these positions (Hossain, 1988).

Loans are given to individuals (for a maximum of 10,000 TK) without collateral and must be repaid in equal weekly installments over one year. Initially, two members of a group are given credit and observed for one or two months. If they pay their weekly installments and maintain group discipline, new loans are given to the next two members. The group leader is customarily the last to receive credit. If any member defaults, the whole group becomes ineligible to receive additional loans from the Grameen Bank. This rule compels members to pressure one another to keep up with regular payments. Thus, although credit is given to an individual member, the group is ultimately responsible for repaying loans (Khandker et al., 1995).

The Grameen Bank, unlike many other development financial institutions, considers saving mobilization to be an integral part of lending. Each member is required to save at least 1 Taka every week, which is deposited at the weekly meeting. In addition, each borrower is required to contribute 5 % of their borrowed amount to the “group fund”. The group fund is self-managed and can be used for mutually agreed upon purposes (Khandker et al., 1995). They argued that the deposits made provide additional much needed loanable fund for the poor.

Similarly, DECSI uses group based delivery mechanism. Borrowers form groups of five to seven whom are not related at least up to three bloods, and this group is the basic unit. Men and women form separate groups in accordance with the socio-cultural conditions of the region. DECSI follows a community participatory approach in which the community, the baitos (local councils) and the direct beneficiaries carry out beneficiaries' selection, group formation and implementation. The members democratically elect group and center leaders and the positions are held by rotation giving every member an opportunity to develop leadership, managerial skills and experience. Meetings are held at center monthly (it was weekly initially).

The maximum loan amount given to borrowers is Birr 5000 and the minimum is Birr 50 without collateral and the loan has to be repaid over a year. All members of a group are given credit at once at a time including the chairperson. Similar to the Grameen Bank, in the case of DECSI as well group members are jointly liable for each loan; it represents a form of social collateral. The rationale of group based lending is that if a member is having difficulty with repayments, others in the group will put pressure on that member to repay, and if this pressure fails and the member defaults on the loan, the whole group will repay the loan on behalf of the member.

DECSI also considers saving mobilization as an integral part of lending. Group saving constitutes a group tax of 5 percent of all regular loans disbursed and a group members' monthly contribution of one Birr. This serves as collateral for loans taken by the group members. Half of the group fund can be lent to its contributors for any purpose. Center savings constitute each center members' monthly contribution of one Birr.

Targeted Clientele

The Grameen Bank target group is strictly limited to people who does not own more than half an acre of land. On the other hand, the target group of DECSI is the rural and urban poor who are not currently catered for by the existing banking institutions. The definition of the poor, however, differs from locality to locality. For the sake of convenience the number of livestock, or equivalent wealth, is used as criteria for considering an individual poor. In principle, therefore, DECSI serves those who have two or fewer oxen, or its equivalents, and are active and have the ability and motivation to work. Both institutions give priority to women as they are on the one hand the most vulnerable group to poverty and on the other hand more effective credit and saving clients. Thus, both institutions have targeted the bottom of the society in their respective countries.

Financial Services Provided

Both institutions offer basically financial services to their clients mainly; credit facilities and saving mobilization. In addition to financial services, however, the Grameen Bank has devised and implemented diverse programs to promote social development. It encourages members to open nursery schools at its centers, distributes seeds and seedlings to promote gardening and planting, and helps them improve health, nutrition and productivity. In addition to the financial services, DECSI currently is also providing non-financial services like pension payment.

As tried to explain elsewhere above, the Grameen Bank model is being tried in many countries including Ethiopia. An important question raised here is that whether this group based lending is applicable in Ethiopia. With reference to this state of affairs, Hossain (1988) noted that one of the important lessons of the Grameen Bank is that appropriate procedures can be developed only after considerable experimentation through a thorough understanding of the physical and socio-economic environment. He further argued that it is the action research approach that enabled the bank to finally achieve a degree of "fit" between program design, beneficiaries needs, and its organizational capacity. Therefore, taking the Grameen Bank as an initial model for small-scale experiment project that is closely monitored and modified during implementation warrants a better chance of success as opposed to photocopying the model as it is on a large scale.

Hossain (1988) argued that the Grameen Bank approach has a fair chance of success in densely settled, poverty stricken areas of Asia, but for Africa an appropriate delivery mechanism has to be worked out through trial and error. Therefore, he concluded that an approach or method can not be replicated in a fixed, prescriptionary sense and one of the important lessons of the Grameen Bank is that appropriate procedures can be developed only after considerable experimentation.

Likewise, Checkol (1994) concluded on replicating of the Grameen Bank model in Tigray that the model should be taken as an experimental model that is going to be modified and adopted to fit the physical and socio-economic situation in the region.

Based on this conceptual framework, DECSI started its operation in 1994 on a small scale in eight branches. The scheme was initially almost a direct copy of the Grameen Bank. The branches' establishment was based on the Grameen Bank principles taking the bank to the people and bank activities were conducted/reported at weekly meetings. Through learning effect, however, the institution modified some of the elements of the model by considering the physical and socio-economic environment of the region. Among those were making the meetings monthly and taking the people to the institution using community participatory approach since taking the institution to the people and frequent contact of the institution's staff with beneficiaries was costly for sparsely settled environment like Ethiopia in general and Tigray in particular.

1.2 Statement of the Problem

Development Specialists have emphasized the informal sector's importance as a creator of jobs and an incubator of small and medium enterprises. In this view, the informal sector is a giant sponge, absorbing much of the shock of periodic economic contraction by soaking up excess labor and by providing second incomes to individuals whose real incomes have been eroded by inflation and public spending cutbacks. In addition, very small enterprises often are viewed as training grounds for prospective formal owners (Fidler and Webster, 1996). Overall, the prevailing operation of the formal financial institutions in many low-income countries such as Ethiopia is inefficient in providing sustainable credit facilities to the poor.

✦ As stated in the previous section, very little credit is available in many developing countries to the agricultural sector as a whole and to the small poor farmers in particular. Small farmers are

taken as a high risk borrowers by both formal and informal lending sources. Efforts to improve small farmers' asset holdings and establish a viable production unit to generate income are frustrated because of poor farmers' lack of access to financial markets that are appropriate to their situation. Thus, it became necessary to evolve an appropriate rural credit institution that responds to those who are at the lower income brackets of the society and therefore targeting credit to the poor was found to be one of the many instruments for poverty reduction.⁴ With this basic idea, micro-financing institutions have been applied in various ways, by different bodies, in Ethiopia with the ultimate goal of poverty alleviation. The impact assessments of micro-financing institutions therefore become essential to evaluate whether the scheme is successful or not related with the target.

Since the micro-finance institutions use loanable funds from various sources to finance productive activities, it can only sustain its operation if it remains financially sound. On the other hand, since it is an organization for the poor, it can not sustain its operations unless the benefits received from program participation reduce poverty and are sustainable.⁵ In short, the micro-finance institution actively promotes its own institutional, financial, and economical viability as well as that of its clients (Khandker et al., 1995)

From the above statements, it is necessary to assess the impact on the intended beneficiaries. Impact may be measured on income, wealth, food security, child-nutrition, quality of life, gender relations, etc. Since sustainability of micro-financing programs calls for noticeable positive impact of the program on target groups and better loan repayment performance, specific case studies on impact assessment and knowledge of the factors affecting loan repayment

performance are of absolute necessity. However, available evidence on the impact of micro-enterprise credit and information on the factors of loan repayment performance is very limited in Ethiopia. So there is a need for more research on this subject.

☞ Bearing all these in mind, then, I deem the research on DECSI and this study is intended to contribute research and information to fill this gap considering the case of micro-financing by DECSI in Tigray.

1.3 Objective of the Study

As explained above, targeting credit to the poor is one of the many instruments for poverty reduction. With this basic idea, microfinance institutions including DECSI have been applied in Ethiopia with the ultimate goal of poverty alleviation. Therefore, the purpose of this study is to understand what DECSI is, whom it serves and what contributes to poverty alleviation, and whether it is sustainable with the following specific objectives.

- a) to evaluate the impact of the scheme on economic conditions of borrowers, i.e. to poverty alleviation
- b) to evaluate the loan repayment performance and identifying its determinants
- c) to investigate and collate the relevance and applicability of Grameen Bank model to the Ethiopian condition with particular reference to DECSI in Tigray and to make conclusions thereof; and

- d) to highlight some mechanisms for improved micro-enterprise financing in the country as well as future research direction in the area.

1.4 Significance of the Study

As explained above, micro-financial institutions, whose objective is targeting credit to the poor, are powerful anti-poverty tool that have demonstrated relevance to people in nearly every country. These institutions are engaged in the provision of loans to poor people for self-employment projects that generate income and allow them to care for themselves and their families.⁴ Micro-financing institutions are believed to help borrowers work their way out of poverty, stimulate savings accumulation among poor people, make programs to grow and serve a large number of very poor people, be a vehicle for a variety of desirable social development and empower people to end their own poverty.⁵

The micro-financing institutions should not be dependent on outside support (donation) in the long run.⁶ Thus, they should generate reasonable income to finance recurrent expenses so as to give sustainable services. As a result of this, such financial assistance schemes must be sustainable contributing to the alleviation of poverty in the short-run while targeting at economic growth in the long run. Therefore, this calls for a noticeable positive impact of the assistance as well as efficient loan repayment performance.

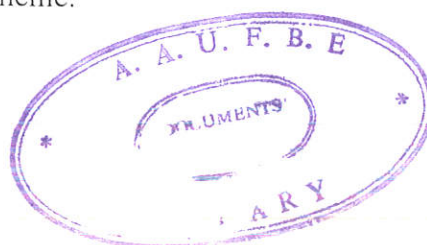
Descriptive analysis on credit provision and its impact of DECSI was conducted and the study identified that credit provision had a significant impact on increasing agricultural production

through the build up of production assets, particularly draught oxen, and increasing the amount of land farmed by clients who were able to retrieve land previously rented out and farm it themselves. Also, trading activities engaged in by clients increased in scale. However, those studies were not detail and comprehensive in the sense that they did not show the impact of the program on household consumption, saving, access to education and medical facilities, household diet, other facilities, etc. Also, factors that determine DECSI's repayment performance have not been modeled before.

Based on the results of the study, policy implications are to be put forward which can help policy makers and financing institutions in designing an effective micro-financing scheme in the country. And also the study will contribute to the literature of the country on the subject. Finally, this study is intended to fill research and information gap of DECSI in Tigray.

1.5 Limitations of the Study

Evaluation of micro-financing schemes especially its sustainability calls for the consideration of financial and economic viability, institutional viability and borrower viability. This study however considers only the issue of borrower viability by evaluating the impact of DECSI micro financing on beneficiaries' economic and social conditions and by identifying the determinants of loan repayment performance. So the major limitation of the study is its neglect of the other components of sustainability: financial, economic and institutional viability. Nevertheless, although partially, it should be noted that the findings of this study would shade some light on the issues of the sustainability of DECSI micro-financing scheme.



1.6 Contents of the Chapters

This part of the paper, which comprises discussions on the poverty alleviation program in the country and the approach of the research carried out, is to serve as chapter one. In chapter two, theoretical and empirical literature of the subject is reviewed. In chapter three, methodologies employed for data collection and analysis during the study are discussed. Chapter four presents the empirical results of the study. Finally, chapter five gives the conclusions and policy implications drawn from the study.

CHAPTER 2 REVIEW OF LITERATURE

2.1 Theoretical Literature

2.1.1 The Need for Micro-Financing and Poverty Alleviation

The orthodox explanation of the need for credit on the part of small-scale entrepreneurs and peasant farmers hinges on two factors: poverty and the alleged exploitative nature of informal credit. First, the majority of people in developing countries are considered to be very poor and unable to accumulate substantial savings; they need external finance to break away from the vicious circle of poverty. An external "push" is, therefore, necessary for the economic development of these developing countries. Second, informal finance is considered to be exploitative: interest rates and other charges on loans are considered to be much higher and usurious compared with those in the formal sector. Hence, there is a need to rescue small-scale borrowers from the clutches of rapacious lenders in the informal sector by providing formal finance at reasonable rates and charges (Hyuha et al., 1993).

Lack of access to institutional credit is one of the crucial factors impeding peasant agricultural production in particular and rural development in general. Fidler and Webster (1996), in their study of the informal sectors of West Africa, stated that entrepreneurs asked to report their most serious financial constraint indicated lack of money, specifically insufficient working capital and inability to get source of borrowing as the major problem facing their businesses.

Thus, an inadequate supply of credit is an important constraint on production in many developing countries. Making credit available, particularly to the rural poor, is thus considered

essential to alleviate poverty and promote economic development. Although informal credit markets operate widely in rural areas, moneylenders typically charge very high interest rates, inhibiting the rural poor from investing in productive income-increasing activities (Khandker et al., 1995, Fidler and Webster 1996). Since micro-enterprises have very limited access to formal finance-credit from banks, specialized financing schemes must be designed to facilitate credit access to the poor (micro-enterprise operators), enhancing their productivity and income generating capacity. Cognizant of this situation, governments in various parts of the world have promoted micro-finance institutions to address the problem by providing cheaper credit to the rural poor.

✕ Moreover, private sector non-profit organizations (referred to as non-governmental organizations-NGOs) aiming to bring about reductions in poverty have become increasingly involved in providing financial services. Of those NGOs, most have experiences in savings and credit, often linked to programs of income generation. The very small deposits and loans of such organizations are referred to together as "Micro-finance"(Johnson and Rogaly, 1997).

Current literature considers that targeting credit to the poor is one of many instruments for poverty alleviation (Sinha, 1998) and thus, micro-credit programs have emerged as an anti-poverty instrument in many low-income countries (Khandker, 1998, Fidler and Webster, 1996). Since lending to the poor is expensive and costs can be high, especially for formal lenders (Sinha, 1998), specialized institutional credit is therefore becoming increasingly important to increase incomes and to help them become self-employed in rural non-farm activities of their choices (Khandker, 1998).

Over the last decades, Grameen Bank and other micro-finance institutions (MFIs) have devised innovative credit programs to address market failure and deliver credit to the poor. MFIs use peer monitoring and the joint liability structure to overcome the screening, monitoring and enforcement problems commonly encountered by formal lending institutions (Sinha, 1998). Hoff and Stiglitz (1990) argued that observed features of rural credit markets in developing countries can be understood as responses to the problems of screening, incentives, and enforcement. Of course, these are problems that arise not just in developing countries. However, it can be argued that these problems are more severe for countries at an early stage of development because of more extensive asymmetries of information and the more limited scope for legal enforcement (in particular, more limited collateral). According to their study, they argued on the suggestions given by several studies (Yaron, 1994, Khandker et.al, 1995) that as development proceeds and average income levels increase the imperfection of rural credit markets should diminish.

Stiglitz (1990), in his study of Peer Monitoring and Credit Markets, identified the value of peer monitoring by suggesting some of the ingredients in the design of the peer monitoring systems. First, the members of the peer group must be provided with incentives to monitor the actions of their peers. In the Grameen Bank this is provided by stipulating the access to future loans by each member of the peer group depending on the repayment performance of all the members.

The availability of credit to low income households enables them to take advantage of their means of production and services. With appropriate credit institution and credit policies, it is possible to improve the unsatisfactory levels of living of poor households by enabling them to borrow. Fidler and Webster (1996), argue that provision of saving service help the poor to accumulate capital and respond to emergencies and overcome sharp declines in income.

Moreover, they argue that financial sectors play a key role in the efficient allocation of resources by shifting funds from surplus to deficit locations and from less profitable to more profitable activities.

Johnson and Rogaly (1997) have explained that if poverty is understood as low levels of annual income per household, reducing poverty is about raising average income levels. If a particular level of annual income per head is used as a poverty line, poverty reduction could be measured by counting the number of the proportion of people who cross that line, i.e., who are promoted out of poverty. They noted that providers of financial services who aim to enable people to cross such a poverty line have focussed on credit, in particular credit for small enterprises, including agricultural production. However, Johnson and Rogaly (1997) noted that poverty could also be understood as vulnerability to downward fluctuations in income. They recommended that interventions which reduce such vulnerability and protect livelihoods also reduce poverty. For instance, saving mobilization scheme is designed to address production and other risks as well as market imperfections. The deposits made provide additional much needed loanable funds for the poor. Such deposit also foster financial discipline and help borrowers smooth out consumption if they incur income losses due to production failure. Therefore, it is this kind of service which can effectively reduce poverty by enabling people to protect their incomes (Johnson and Rogaly, 1997, Khandker et al., 1995).

Small-scale producers particularly, in many developing countries lack access to formal credit because the transaction's costs per unit of lending for small loans are much higher, small amount borrowers are considered riskier than large borrowers, and patronage and corruption in the lending institutions reduce the share of credit for small borrowers. Furthermore, when formal lending is entirely dependent on physical collateral because lenders perceive credit risk to be

inversely related to asset ownership, the poor and women are left out of the formal credit system (Khandker et al., 1995).

As explained above, the failure of formal institutions to serve the poor led to the evolution of alternative systems of financial intermediation, such as credit cooperatives and lending groups (Huppi and Feder, 1990). These group-based credit systems addressed the problems of screening, incentives, and enforcement by incorporating joint liability and monitoring. It was believed that the risk of default and transaction costs would be reduced by introducing such credit schemes. Adams and Von Pischke (1992) and Yaron (1992) noted that this approach has been successful in Bangladesh, Cameroon, Malaysia and the Republic of Korea due to better incentives, control and monitoring systems.

2.1.2 Targeting in Micro-Financing

A major concern of micro-financing institutions involved in credit provision has always been how to reach poor people i.e. target group. Johnson and Rogaly (1997) explained that some organizations target the poor by defining the criteria which users have to meet in order to be eligible for loans; but they argued that:

"self-targeting is increasingly becoming a feature of the design of intervention, with members choosing to join the scheme as a result of the services on offer rather than the implementers of the scheme choosing them. For example, by defining an asset or land holding ceiling for members; many of the well-known schemes in Bangladesh impose a land-holding ceiling of half an acre. However, micro-finance institution workers do not usually seek proof of the size of land-holding, and it is easy to disguise or conceal the amount held; as a result the rule is not strictly enforced".

Johnson and Rogaly (1997) gave an alternative to directly targeting a particular group which is to use design features which result in the better-off excluding themselves. Two such design features have been used by many schemes: loan sizes and the holding of compulsory regular meetings to qualify for loans and to make repayments. Then they argued that richer people are less likely to be interested in very small loans or in attending regular meetings, whereas repayment at weekly or fortnightly meetings may be attractive to poorer people who feel able to manage small, regular cash repayments out of their normal income.

Stiglitz (1990) noted that the failure of formal institutions to reach the rural poor led to the evolution of credit cooperatives and lending groups as alternative vehicles of rural financial intermediate. Both group-based organizations and credit cooperatives were seen as ways of reaching those who did not otherwise have access to the formal financial system. The risks of default and transaction costs were also expected to decrease as these groups incorporated some form of joint liability and monitoring.

The Grameen Bank emphasis on lending to groups of people with similar backgrounds and bargaining power is one of its defenses against the problem arising from asymmetric information and imperfect enforcement. In an imperfect world where information is costly to collect, group lending enables the Bank to circumvent potential adverse selection problems. This approach helps to develop effective communication between borrowers and bank staff and makes borrowers' activities transparent. Group lending relies on peer pressure to monitor and enforce contracts, provides incentive for the borrowers to repay, and helps screen good borrowers from bad borrowers (Khandker et al. 1995)

Khandker et al. (1995) also noted that to address the twin problems of asymmetric information and imperfect enforcement in rural credit markets, credit-providing institutions target clientele in order to reduce the risk of default. Traditional moneylenders target clientele from their neighborhoods or select borrowers based on patron-client relationships (through employment or other transactions) having near-perfect information on the activities of potential borrowers. On the other hand, commercial banks or other development finance institutions lend, by government mandate, on the basis of asset ownership to avoid adverse selection of borrowers.

Further more, they explained that in order to reduce transaction costs and default risks, formal lenders target a clientele that is able to provide collateral often worth two to three times more than the loan itself. Such collateral based targeting scheme has been a standard policy in many developing countries, based on the notion that credit risk and transaction costs relative to transaction size are inversely related to individual assets ownership.

*On the other hand, the Grameen Bank targets the land less, low-income strata of the rural population that are willing to bear the costs of group formation and training and monitor each other's activities. Since these people often lack alternative sources of credit at low rates of interest, the Grammen Bank has created a market niche or franchise (Von Pischke, 1991).

As such, the Grameen Bank is no different from any formal or informal lender who provides credit in an imperfect market. For the latter, targeting is implicit, while for the Grameen Bank, it is explicit. From above argument, it follows that the Grameen Bank has utilized self-selected groups to monitor the activities of borrowers, encourage them to repay and enforce contracts. Thus, it has a better incentive and enforcement mechanism to deal with the problems of

asymmetric information and imperfect enforcement (Khandker et al., 1995). Stiglitz (1990) also pointed out that the members of the peer group must be provided with incentive to monitor the action of their peers.

2.1.3 Impact Assessment and Sustainability

Johnson and Rogaly (1997) noted that if financial service provision has had poverty reduction as a goal, it is particularly important to know whether, by how much, and for whom poverty has reduced (or increased) and the extent to which these changes have occurred as a result of the intervention.

Assessing micro-finance impact has been the main concern of development specialists. Sinha (1998) argued that impact assessments are usually promoted by donors keen to assess whether support of micro-credit programs is "good value for money". For this it is necessary to "prove impact" on the intended beneficiaries. This is not always easy. As stated by Sinha, an immediate question is impact on what? Impact may be measured on income, wealth, food security, child nutrition, employment, and quality of life or gender relations.

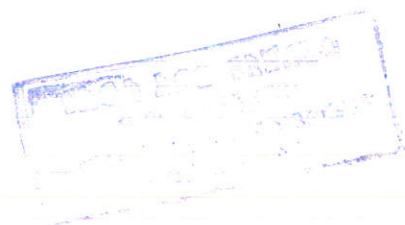
Sinha stressed that the impact of micro-credit programs on poverty is notoriously difficult to measure. While Pitt and Khandker (1996) have systematically evaluated the impact of targeted credit schemes on productivity, incomes or living standards of borrowers, Fidler and Webster (1996) consider the possibility of comparing the income of participants to that of control group of non-participants, not forgetting the difficulty of controlling other variables. In relation to this Khandker (1998) argued that "the immediate impact of having access to credit from a micro-credit program is on employment and income. The induced income and employment effects may have impact on other outcomes such as consumption, nutrition, contraceptive use, fertility, and

education. In addition, asset accumulation and hence household net worth may increase if incomes generated from self-employment are sufficient to cover the costs of participation."

As of the definition of poverty, Johnson and Rogaly (1997) gave three ways: lack of income, vulnerability to fluctuations, and powerlessness. They argued that interventions could attempt to reduce poverty by raising incomes (income promotion); increasing income and livelihood security (protection); or empowering people who lack control and choice in their lives. As a result impact assessment of financial services therefore has usually focussed on the first of these: income promotion. Thus emphasis has been placed on measuring changes in income levels following credit programs, especially those where loans have been directed to specific uses (Johnson and Rogaly, 1997).

Fidler and Webster (1996) stressed the existence of methodological difficulties associated with the measurement of the impact of the assistance programs towards poverty reduction. Adams and Von Pischke (1992) and Fidler and Webster (1996) also consider the possibility of comparing the income of participants to that of control group of non- participants, not forgetting the difficulties of controlling other variables.

Most researchers like Fidler and Webster (1996), Sinha (1998), Khandker (1998) also propose the descriptive approach, comparing household outcomes before and after loan, some people (especially those who assess agricultural credit) model credit impact using a production function considering credit as one of the explanatory variables. It should be noted that both approaches are not without a challenge. Adams (1988) challenged these approaches by pointing out that the methods and assumptions used in measuring credit impact are suspect and impact studies ignore saving activities. He argues that "it is a mistake to include loans as a variable in the production



function with other inputs, as most researchers have done". He also indicates that it is difficult to sort the loan effects from the effects of technical assistance.

✶ Yaron (1994) has indicated that two objectives are paramount for a rural financial institution (RFIs) to be successful: financial self-sustainability and substantial outreach to the target rural population. By financial self-sustainability is implied when the return on equity, net of any subsidy received, equals or exceeds the opportunity cost of funds. Dependence on subsidies is the inverse of self-sustainability. On the other hand, outreach is assessed on the basis of the type of clientele served and the variety of financial service offered, including: -

- the value and number of loans extended
- the value and the number of saving accounts
- the type of financial services offered
- the number of branches and village sub-branches
- the percentage of total rural population served
- the real annual growth of the RFIs assets over recent years
- the participation of women as clients(Yaron, 1994)

A micro-credit scheme offers its services to targeted poor on the basis of certain criteria if it is to be sustainable in providing its activities. Sustainability relates to the ability of a program to continuously maintain its activities and services in order to meet its objectives. Khandker et al. (1995) report four interrelated concepts of sustainability: financial viability, economic viability,

institutional viability and borrower viability. According to this very report, "the Grameen Bank is defined as financially viable if it can at least equalize the cost per taka (Bangladesh currency) lent with the price (i.e., the interest rate) it charges its borrowers. It is defined as economically viable if it can meet the economic cost of funds (the opportunity cost) used for credit and other operations with the income it generates from lending. In order to be institutionally viable, it must have effective and well-institutionalized procedures for ensuring administration and management succession, so that it is not dependent on the leadership of a particular person. The management and its decisions making structure can be a measure of this. Finally, borrower viability refers to whether the borrowers have achieved higher income flows overtime and are able to repay their loans."

Micro-finance specialists have argued that the prospects for the scheme's stability are improved by innovations such as social collateral and regular repayment installments. Indeed, financial sustainability has become an important goal in itself (Johnson and Rogaly, 1997). They also argued that to achieve sustainability, micro-finance institutions, be they NGOs, government agencies, or commercial banks, need to ensure that the costs of providing the services are kept low and are covered by income earned through interest and fees on loans. Further, they noted that since micro-finance deals, by definition, with small loans, the income generated through interest payments is also small in comparison with administration costs. To generate profits, therefore, they conclude that it is necessary to increase scale, in other words, to lend to a large number of people.

As Khandker et al. (1995) put it, the term "program sustainability" means the ability of program continuously to carry out activities and services in pursuit of its objectives or, in the Grameen Bank's case, the ability to continue operating as a development financial institution for the rural

poor. On the other hand, since it is an organization for the poor, it can not sustain its operations unless the benefits received from program participation reduce poverty and are sustainable.

A current central concern is to reconcile how micro-financial institutions can continue to lend, without recourse to subsidized funds (i.e. be sustainable), to more poor people (i.e. increase outreach). Financial sustainability is regarded as a means of increasing outreach since "sustainability today is outreach to the poor tomorrow" (Sinha, 1998). Khandker et al. (1995) argued that "loan recovery enhances profitability by turning over loanable funds and minimizing default, thus improving the viability of the Grameen Bank." Johnson and Rogaly (1997) also shared the same concept that the repayment rate is the indicator most often used as a measure of the performance of a credit scheme. Hence, good loan repayment is necessary for efficient operation of micro-financing institutions and for the realization of funds for the future lending.

Various studies have been conducted regarding micro-finance performance in terms of loan repayment. Accordingly, a number of factors have been raised as influencing loan repayment performance and based on this, researchers use regression models for assessing factors that determine loan repayment performance.

In general, from the experience of the Grameen Bank, it is observed that the Bank has successfully reached its target group with credit and has shown that poor people can benefit from subsidized credit programs. Factors that have contributed to the success of the Bank are; formation of peer pressure group and strict loan repayment discipline, collection of loans on small installments, supervision and monitoring, and availability of subsidy on sustainable basis (Hossain, 1988).

2.2 Empirical Literature

Impact analysis of beneficiaries from several micro-finance programs have indicated that loan recipients have been able to have higher and stable income compared to the condition prior to their participation in the program. According to Hossain (1988) "Grameen Bank has made a positive contribution to the alleviation of poverty in the area of its operation. The bank has successfully reached its target group with credit, and has ensured both productive utilization of loans and their recovery in due time, thus helping to improve the living standard of more than 90 percent of the participants."

A similar study made on Indonesia's Bank Rakyat micro-financing impact "shows that its borrowers have increased their net enterprise income by 93 percent"(Fidler and Webster, 1996). In general, we can say that most impact assessment studies have reported the positive contribution of the assistance programs to poverty reduction. And this is one of the requirements of program sustainability. Also, Johnson and Rogaly (1997) have indicated an improvement in milk output and raised income in the Turucucho community associated with loan granted by "Casa Campensina Cayambe" financing scheme to grass land management in Ecuador.

Khandker et al. (1995) reported that the emphasis on female membership would have a long-term impact on economic development. Women were previously considered high-risk borrowers due to child bearing and other associated health hazards. However, the Grameen Bank has

proven that women are better credit risks than men, since loan recovery rates have been higher for women than for men. According to their report, the recovery rate for general loans was 97% for women compared to 89% for men and this reveals that women are more disciplined than men at least in regard to repayments.

The ability of some of the best known institutions which have been operating in the provision of credit to gain consistently high repayment rates of 90 percent and above, and to extend their coverage to a relatively large numbers of individuals have raised expectation that such micro finance institutions may be able to become sustainable in the long term (Johnson and Rogaly, 1997). Accordingly, they reported a repayment rate for NGO's involved micro finance institutions of three countries as 95%, 100% and 82% in Mexico, Pakistan and Ecuador respectively.

With respect to loan repayment (recovery) rates, Khandker et al. (1995) reported a lower rate for commercial banks and other development finance institutions (ranging from 25 to 50 percent) while mentioning a 95 percent loan recovery for the Grameen Bank. Fidler and Webster (1996) also indicated an average of 89 percent loan repayment rate for the forty-four micro-finance programs reviewed by them in West Africa.

The study conducted by Hossain (1998) on Grameen Bank in Bangladesh applied a probit model by regressing a dichotomous dependent variable, which measures participation in the Grameen Bank (1 for participants and 0 for non-participants), to a number of exogenous variables by considering a set of samples (participants with the target group, non-participants in project villages, and participants with the target group in the control villages). The study reported that the Grameen Bank participants had larger families, were younger, better educated, and pursued

more non-agricultural activities than the non-participants in both project and control villages. He further reported that within the project villages, the difference between the two groups was not statistically significant at less than 5 percent.

Kulundu (1990) tried to identify the relative importance of the factors that affect loan repayment performance by small holder farmers in Lugari Division, Kenya employing primary cross-sectional data and recursive type of model in which loan diversion and loan repayment performance equations are estimated sequentially. Using OLS he found that loan diversion, use of purchased farm inputs, farm income, sources of income from farming activities and farmers attitude towards loan repayment have statistically significant influence on loan repayment while factors such as crop performance, off-farm income & general farmers education are reported to have statistically insignificant influence on loan repayment performance.

With respect to the direction of the influence he showed that, the proportion of loan funds diverted, sources of income from farming & farmers attitude towards loan repayment to be positively related to the proportion of arrears on loans advanced to farmers. On the other hand, the ratio of farm income to loan advanced & use of purchased farm inputs are reported to have an inverse relationship with the proportion of arrears on loans. His result suggests that delay in loan issuance and inadequate supervision and technical advice on improved farming methods are significant determinants of loan diversion.

The study by Kashuliza (1993), on Tanzanian case, shows a negative and significant relationship between household expenditure and loan repayment performance while positive and significant



relationship between farm income and loan repayment performance. The negative correlation between household expenditure and loan repayment performance suggests that household with high consumption expenditures are more likely to default loan repayments than those with smaller expenditure. Consistent with this explanation, he reported that the variable representing household size was also negatively associated with loan repayment performance but statistically insignificant. He obtained negative and positive signs for age and level of education respectively with loan repayment, but statistically insignificant in explaining the loan repayment performance. Also borrowers attitude towards loan repayment is reported to be positively and significantly related with loan repayment.

2.3 Literature on the Subject as Regards Ethiopia

When we look at the Ethiopian situation, impact assessment studies are very limited. Solomon (1996) considered the case of financing micro-enterprises in the Debre-Berhan Town. According to the study the average recovery rate of micro-enterprises is 93 percent and he noted that this rate is quite remarkable even when compared with the experience of the Malaysian Projek Ikatiar (78 percent), Nigeria (86 percent) and India (90-95 percent). He also identified that preliminary impact evaluation of the randomly taken 65 borrowers show that about half (49 percent) of the sample household's have experienced an increase in income levels due to the loan.

Mengistu (1998) noted the achievement of some positive results considering the increase in the number of program beneficiaries. He argues that the increase in the number of program beneficiaries is one indicator of the contribution of the assistance program to employment creation and generation. Also he mentioned the increased level of credit ceiling (from Birr 1000

to Birr 5000) as well as the use of saving account as indicator of the growth of micro-enterprises towards the formal sector.

In relation to this, Muluwork (1997) reported the positive impact of micro-financing with particular reference to DECSI on employment creation, on improvement of the living conditions of the beneficiaries, on education, on fast repayment of credits, with respect to establishing a viable production unit to generate sustained income, with its target groups, and with the compulsory saving program (saving mobilization). According to the study, voluntary saving is done by a significant number of respondents. That is 13 out of 30 rural and 18 out of 40 urban respondents have made voluntary saving. The highest urban saving by an individual respondent that is not related to agriculture is Birr 2500 while that of rural activities related to agriculture is Birr 1500. He indicated that, this area needs much effort because saving mobilization is the means of building loanable fund for expanding services, especially if the institution is to meet the growing demands that are coming due to demonstration effects. He then concluded that most of the member clients of the rural credit program have become much better off as compared to their former conditions.

Similarly, Fewena (1999) has conducted an impact assessment of micro-credit at household level by taking DECSI as a case study. According to the study, she reported that credit provision had a significant impact on increasing agricultural production and the building up of production assets. Besides, female clients particularly were able to take on trading activities which had previously been inaccessible to them through lack of capital. She also noted that the increased income generated by the credit input had a positive impact on household food supply primarily, and on educational provision for children as well as clothing and other basic necessities.

However, she argued that the positive impact was dependent on continued access to credit, on a regular basis, and where this was interrupted, the improvement in household income rapidly decreased.

Further more, Zaid (1999) undertook a preliminary impact assessment of DECSI's credit in Tigray. He concluded that about 43% of the respondents attested that their living conditions in the last three years have shown a clear upward trend and this trend can be the result of many factors. However, they argued that DECSI has clearly been a major contributor to such a clear upward trend.

In relation to the replicability of the Grameen Bank, Chekol (1994) conducted a study on the subject with respect to the Grameen Bank in Tigray and he concluded that replicating the Grameen Bank model as it is in Tigray is going to be neither smooth nor necessary. He also noted that in general replicating a successful model in one environment can be problematic in another environment and therefore there is no one best model that fits any environmental situation. Further, he argued that the model should only be taken as an experimental model that is going to be modified and adapted to fit the physical and socio-economic situation in Ethiopia.

As to repayment rates, Mengistu (1998) reported a repayment rate of 92% for the micro-enterprise project micro-financing scheme under the Market Towns Development (MTDP). In the case of Debre Berhan micro-financing, Solomon (1996) reported an average loan recovery rate of 93%.

Berhanu (1999) reported a 79% mean loan repayment for (POCSSBO's) the Project Office for the Creation of Small Business Opportunities in Addis Ababa. A repayment rate of 97.76% (Seifu, 1998) is reported in DECSI's credit scheme in Tigray.

Available evidence suggests that empirical studies on the determinants of loan repayment performance are very limited in Ethiopia. Mengistu (1997) suggests a large number of factors that affect loan repayment performance: loan size, household income, the level of education of the borrower, loan supervision, borrower's attitude towards loan repayment, diversified sources of income, loan diversion, use of purchased inputs, household size, interest on loan, business experience, value of assets, credit experience, borrower age, sex, grace period, delayed loan issuance, etc.

Mengistu (1997) employed probit model to analyze loan repayment affecting factors in his study on the determinants of loan repayment performance in Bahir Dar and Awasa under the micro-enterprise project scheme. According to the estimates, he reported that the number of workers employed has positive relation with full loan repayment for both towns. Age and weekly repayment period have positive relation with full loan repayment in the case of Awasa. Loan size and loan diversion is negatively related to full repayment for both cases. Furthermore, expectation for another loan and availability of other sources of credit which are considered to work in the case of Bahir Dar only have statistically significant relation with full loan repayment.

Berhanu (1999) has provided a study on the determinants of loan repayments performance in Addis Ababa on the case of the Project for the Creation of Small Scale Business Opportunities (POCSSBO). Using a probit model, he has reported several factors that significantly influence

the probability of full loan repayment under POCSSBO's scheme. One such factor is loan diversion rate, which is found to be negatively related with full loan repayment. The regression results also indicate that age, perceived costs of default and suitability of repayment period are the other significant determinants of full loan repayment performance. He further concluded that such systematic identification of factors affecting loan repayment with their enhancing or undermining effect is important in the design of better loan repayment mechanism.

However, the factors that determine DECSI's loan repayment performance have not been properly modeled. Besides, detail and comprehensive impact assessment has not yet been conducted. Therefore, this study is believed to contribute research and information to fill this gap and to enrich the literature in the country on the subject. Besides, it is expected to produce policy implications that are to be put forward that can help policy makers and financing institutions in designing an effective micro-financing scheme in the country.

CHAPTER 3 DATA AND METHODOLOGY

3.1 Data Type and Source

This study employs primary and cross-sectional data on DECSI beneficiaries in Tigray region. The data was collected during the months of January to February 2000 using structured questionnaire through trained enumerators as well as discussions conducted with borrowers under DECSI micro-financing scheme. Data generated by the institution have also been used. Borrowers with three consecutive round of regular loans (1997, 1998 and 1999) were considered eligible for the purpose of the study which is also considered a sufficient time to assess the impact of the credit provision. The main reason for selecting only three round of loans is that the institution has started to provide credit for the whole region starting 1997 and onwards, even though DECSI started operation and extending loans to limited areas as back as 1994. This, therefore, helps the research to cover relatively a large part of the region.

As indicated above the data is collected through field surveys in selected sub-branches of Tigray region using a structured questionnaire. Information obtained using the survey questionnaire includes:

- a) Characteristics of sample beneficiaries such as age, sex, marital status, educational background, health status, household size, number of dependent family, employment status, etc.

- b) Amount of loan, the purpose for which the loan is given, the actual use of loan, time of loan issuance as well as loan repayment performance.
- c) Group formation information such as group monitoring, feeling of any obligation to other members of the group, etc.
- d) Income obtained from business financed by the loan and other sources.
- e) Living standards and conditions like nutrition status, educational access, medical access, etc.
- f) Saving and financial records
- g) Beneficiaries' views towards loan repayment and the cost of default.
- h) Loan supervision and support services.
- i) Other relevant variables.

3.2 Sample Design and Procedure

The field survey covered all zones of Tigray except Western Zone mainly due to resource and time constraints. Nevertheless, the data collected is believed to be a representative for the region because of the close similarities of the zones. Accordingly, four sample areas were selected namely, central, eastern, southern and Mekelle and its surroundings. A two-stage sample procedure was adopted: selection of sub-branches from each sample area followed by selection of beneficiaries from each sub-branch. The four sample centers (sub-branches) were selected using random sampling. These are Yechela Abergelle sub-branch from central zone, Wukro sub-branch from eastern zone, Korem sub-branch from southern zone and southern Mekelle and Aynalem sub-branches from Mekelle and its surroundings.

Lists of borrowers were collected from sub-branch offices. Then beneficiaries from each sub-branch were selected using simple random sampling. Most of the sub-branches are differentiated by urban and rural locations. In the sample sub-branches there were a total number of 2348 beneficiaries that took three consecutive round of loan (1997, 1998 & 1999), of which 1019(43 %) were from rural sample areas and 1329(57 %) from urban sample areas.

The term urban in this classification does not necessarily indicate the standard definition of an urban area, but rather the loan is considered as urban loan if it is given for urban type activities like retail trade, food preparation (injera, bread etc.) in small village towns. That is one reason why the percentage share of urban loan becomes higher in the sample population. Secondly, since the institution started to cover the whole region from 1997 and onwards, there was no for example, rural beneficiary in Korem or significant number of rural beneficiaries in Wukro who took three consecutive round of loan from the sub-branches under study until the survey was conducted. A random sample of 251 beneficiaries, which is around 10 % of the total beneficiaries in the sample sub-branches, is then drawn of which 105 were rural beneficiaries and 146 urban beneficiaries. The proportion of these sample beneficiaries is consistent with the composition of rural and urban borrowers discussed above.

The main objective of having data from both rural and urban is to assess the impact of DECSI and the determinants of loan repayments of both rural and urban beneficiaries taken separately and finally to assess same by combining both rural and urban together. Thus a total of 251 beneficiaries were interviewed for this study using a structure questionnaire. Besides, informal

discussions with some of the beneficiaries were also conducted using a tape recorder. The importance of the information collected through informal discussion is to obtain a good understanding of and support for the quantitative data collected through the structured questionnaire.

Like any other survey data, this data may have some limitations. For example, one of the limitations in the data collection is that income, consumption and level of education are collected in ranges (category basis) which may reduce flexibility. Another limitation of the data is on medical and educational expenditures, where the beneficiaries could not even estimate the expense, and as a result these items are dropped out in the loan repayment performance modeling. However, an attempt was made to incorporate in the impact assessment section by considering whether accesses to medical and educational facilities of the beneficiaries are improved or not. In addition, coverage is also another limitation since nation wide data on beneficiaries under different microfinancing schemes is not considered. If this was possible, it may have helped to evaluate the impact of different schemes in the country on poverty alleviation. Thus, given the limited time, resource and other constraints, the study concentrates only on Tigray region.

3.3 Methodology

The following methodologies are employed in analyzing impact assessment and loan repayment performance and the factors affecting it.

3.3.1 Impact Assessment

As noted by Johnson and Rogaly (1997), to analyze the impact of microfinance requires a control group: a sample of people, similar in every other way, who have not received a loan, compared with samples that have. But in practice it is difficult and is time consuming as well as costly to find control groups that are exactly similar to a project group.

Thus, in order to evaluate the impact of DECSI's microfinancing on poverty reduction, the methodology suggested by Fidler and Webster (1996), i.e. evaluation of changes in user livelihoods as a result of microfinancing scheme is employed in the study area. The justification for employing this method is to avoid the practical difficulties associated with production function based impact assessment studies, which consider credit as input. Since credit is a facilitator in the acquisition of inputs, it will be a mistake to consider it as an input in a production function (Adams, 1988).

Thus, as explained above and considering the difficulties involved to establish control group, the methodology indicated by Fidler and Webster (1996) is employed for impact assessment which compares beneficiary's livelihood before and after loan. However, there are some problems

associated with this approach also. Johnson and Rogaly (1997) noted that respondents might not give accurate information if loans have been used for a purpose other than the stipulated one, thus distorting the result of assessment. Also Sinha (1998) and Khandker et al. (1998) pointed out that since money is fungible, it is difficult to isolate credit impact, i.e., to estimate whether the increased income is due to program participation, or would have occurred in any case. Despite these shortcomings this method has increasingly being used by many microfinance specialists, for instance, Fidler and Webster (1996), Khandker (1998) and Sinha (1998) to assess credit impact.

Accordingly, impact assessment on the intended beneficiaries is conducted using this method. Impact may be measured on income, nutrition, access to education, access to medical facilities, savings, employment generation, food security, gender relation, etc. Therefore, descriptive analysis is made on beneficiaries' economic condition before and after participation as perceived by the beneficiaries themselves. This includes comparison of income, savings, nutrition, and educational and medical facilities outcomes before and after loan.

3.3.2 Loan Repayment Performance

In relation to loan repayment rate, Johnson and Rogaly(1997) noted that there are mistakes that is often made in calculating the repayment rates on loans, among others, the rate is not clearly defined in relation to a given time period. Therefore, they concluded that the repayment rate should precisely measure the ratio of payments made to payments scheduled as due at a particular time.

Since the loans provided to the beneficiaries are on a one-year maturity period basis, the loan repayment rate of recent loan (1999) for each beneficiary has been computed. Accordingly, the loan repayment rate for each beneficiary has been calculated as a ratio of total loan paid to total loan supposed to be paid at a particular time.

As Hossain (1988) explained, the traditional banking system rarely provides credit to the poor because they can not provide collateral against which the loan can be granted, they do not maintain accounts for preparation of bankable projects; and also they have a low repayment capacity because, at their subsistence level, the compulsion to consume the additional income is great. He further explained by giving an example i.e., Grameen Bank, and he concluded that since Grameen Bank is providing loans to these people without any collateral, it is important to investigate the repayment behavior of Grameen Bank members. From this conceptual framework then, analyzing the repayment performance of DECSI's beneficiaries has great contribution in assessing the sustainability of the institution.

Johnson and Rogaly (1997) argued that the repayment rate is the indicator most often used as a measure of the performance of a credit scheme. Loan repayment analysts on the other hand assume the existence of factors affecting borrower's behavior positively or negatively i.e., likely to decrease or increase the probability of default, respectively. These considerations are the basis for the modeling of loan repayment performance incorporating both lender and borrower behavior by utilizing non-price information, economic variable etc. (Hunte, 1996).

Therefore, it is hypothesized that DECSI's loan repayment performance is affected by the factors discussed below.

a) Income from Activities Financed by the Loan

An increase in income from activities financed by the loan is expected to have a positive sign since increase in income means more capacity to repay loan. But sometimes success in the business may also mean that a beneficiary is unlikely to need credit from the same source in the future and hence may reduce his/her incentive to pay. In this case the sign of the coefficient of the variable may become negative. In connection with this, Adeyemo (1984, p. 271) pointed out that the probability of the borrowers being unable to repay their loan decreased as income level increases. However, he argued, "there comes a point where at every high levels of income, a higher proportion of delinquent than good borrowers is noticeable, suggesting that the relationship between income and repayment may be non-linear."

b) Availability of Other Source of Income

Some credit beneficiaries may have other income from other sources in addition to the income from activities financed by the loan. These sources are items like remittance, income from government/private employee of other family members, pension, relief assistance, etc. Kulundu (1990) noted that availability of other sources of income (i.e., diversification of income source) is expected to have positive contribution for loan repayment performance. On the other hand, however, availability of other income source may produce carelessness on the part of

beneficiaries in meeting credit obligations since they may not need credit in the future from the same source and in that case the coefficient of the variable under discussion may become negative.

c) **Size of Loan**

This variable may have a mixed impact on loan repayment. If a loan amount is just enough for the intended purpose, it will have a positive impact on the productive capacity of the borrowing enterprise. Von Pischke (1991) argued that "efficient loan sizes fit borrowers repayment capacity and stimulate enterprise." Thus, the sign of the coefficient of this variable is positive. Related with this, Kashuliza (1993), in his study of Loan Repayment and its Determinants in Small-Holder Agriculture in Tanzania, concluded that as the size of the loan increases, repayment rate likewise increases. The explanation for this outcome is that below a certain threshold value (or amount), credit inputs do not effectively promote increases in crop yields or farm income, i.e., such credit packages can not be optimally employed in farming. Thus, positive sign may be expected.

On the other hand, if the loan amount is in excess of the required it will become a burden than help. According to Vigano (1993, p.460) "the higher the ratio amount granted/amount required, the higher is the credit risk." In this case a negative sign will be expected.

Positive or negative sign may be expected when the loan is too small i.e., either it may be easy to re it may be difficult if in expectation of obtaining loan ambitious commitments have been made. If th

is too small it may be easy to repay too small loans thus enhancing performance (positive sign). On the other hand, too small loan may not produce commitment on beneficiaries to use the loan productively (Pischke, 1991) or it may encourage beneficiaries to divert funds to other purposes, increasing credit risk and undermining performance (Vigano, 1993). In this case, therefore, negative sign may be expected.

d) Timeliness of Loan Disbursement

If loan is issued late from the point of view of the borrower, it is likely that the beneficiary could not be able to employ the fund on time and on what he/she planned to do. Related with this variable, Johnson and Rogaly (1997) noted that the timeliness of loan disbursement is important when loans are being used for seasonal activities such as agriculture. This could in turn worsen the prospects of repayment. Thus, the sign of the variable in this case is expected to be negative. On the other hand, however, if the loan is disbursed on time from the point of view of the borrower, then it is likely that the probability of utilizing the loan proceeds on time as well as on what is planned to be accomplished will be higher. In this case, the variable may have a positive sign.

e) Loan Supervision

Loan supervision is an advisory and follow-up activity from kebeles/peasant associations and financial institutions on loan utilization and repayment. Tight and strictly applied supervision will make borrowers observe their credit obligation and as a result borrowers are encouraged to settle their duty by improving loan repayment performance. Thus, the variable will have positive

sign. With unsatisfactory supervision, the loan repayment performance may be negatively affected.

f) The Use of Financial Records

If the borrower uses financial records, it will help to follow up his/her loan repayment position, which contributes for improved loan repayment i.e.; positive sign will be expected. But if the case is otherwise, there may be a lower chance to identify the outstanding balance and this may lead to a weak repayment performance.

g) Appropriateness of the Repayment Period

Since repayment periods are one of the principal features in the design of credit program (Johnson and Rogaly, 1997), it is expected that borrowers who find this repayment period suitable may perform better. The sign is thus expected to be positive.

h) Beneficiary's Attitude to Cost of Default

Among others, cost of default includes claims against personal wealth, claims against guarantees, social sanctions such as loss of social status, loss of future access to credit and other economic benefits. If a borrower feels that one or a combination of these factors is very important, he/she will most likely refrain from making default. In relation to this, Khandker et al. (1995) argued that if the benefits that the institution generates are perceived to be important, default rates

should be lower. In this case, it will have a positive effect on loan repayment performance. On the other hand, Jaffee and Stiglitz (1990, p.863) argued that "a promise to pay in the future is enforced if the borrower faces costs of default that exceed the benefits of default." The opposite will thus happen in the case of credit beneficiaries who undermine these costs.

i) Educational Level of Beneficiary

Normally, a more educated beneficiary is expected to use the loan fund effectively compared to a less educated one and hence the former becomes an active payer. In general, this variable is expected to have a positive sign. But there is nothing that would stop the opposite from happening in case other things do not remain equal.

j) Age of Beneficiary

This variable may assume a positive sign. It is usually believed that with increase in age a borrower may acquire stability (Vigano, 1993) as well as business experience. However, similar to that of the educational level of beneficiaries, nothing can be said about its sign with definiteness.

k) Sex of Beneficiaries

Many microfinance specialists believe that women are better loan payers than male beneficiaries (Hunte, 1996). In relation to this, Khandker et al. (1995, p. 18) explained that women were

previously considered high-risk borrowers due to childbearing and other associated health hazards. However, the Grameen Bank model has proven that women are better credit risks than men since loan recovery rates have been higher for women than for men. In this case, therefore, the variable is expected to be positive. On the other hand, however, some empirical studies obtained the opposite results suggesting that male are rather better loan payers than females. So it is better not to expect the appropriate sign before hand.

l) Asset (Livestock)

Value of assets of borrowers is seen as another loan repayment influencing factor. Due to lack of data on asset in urban beneficiaries, this variable is considered as an influencing factor only for rural beneficiaries. Accordingly, livestock is considered as a proxy for evaluating assets for rural beneficiaries. The more livestock (asset) a beneficiary has the higher capacity to settle his/her obligation whenever he/she faces income fluctuation. Regarding this variable, Vigano (1993) obtained a positive relationship between loan repayment and value of borrower's asset in a study about Burkina Faso. On the other hand, Yaqub (1995) came up with a negative sign. This implies that further research may be required in this regard.

m) Loan Diversion

This refers to the use of loan for purposes other than that specified in the loan agreement between lenders and borrowers. If loan is diverted to non-income generating purposes (such as consumption), it is likely that the sign of this variable will be negative. In other words, diverted

funds not used productively reduce repayment capacity (Von Pischke, 1991). Kulundu (1990, p.29) also argued that "small holder farmers may be unable to repay their loan owing to use of the loan funds for purchases of food, school fees, medical expenses and ceremonies which are degenerative of income." This implies that the loan diversion variable will have a negative coefficient. If, however, the loan is diverted to income generating purposes, the coefficient of the variable will have a positive sign because in a sense, this is a way of income source diversification.

As explained above, it is further hypothesized that the loan diversion rate that has been specified as a factor influencing loan repayment performance earlier is also dependent on factors that are included in the loan repayment equation and others i.e., it is an endogenous to the system. The variables that are considered to affect loan diversion rate (LDR), which is defined as a ratio of loan amount spent on non-intended activities to total loan received (after deduction of 5 % group tax), are discussed as follows.

a) **Dependency Ratio**



In this study, dependency ratio is defined as the percentage share of dependents that depend on the beneficiary for their livelihood. It is, therefore, expected that as the number of dependents increases i.e., the higher the dependency ratio, the greater the borrower will be under pressure to get more money because the beneficiary has the obligation to fulfil the requirements of those dependent families in the household. As a result, the loan may be diverted to meet household obligations. This variable is thus expected to have a positive impact on loan diversion rate.

b) Loan Supervision

If adequate supervision is made from the institution and Kebele/Peasant association on loan utilization, the probability of diverting the loan proceeds for non-intended uses may be lower (a negative sign in this variable). Inadequate supervision in this respect on the other hand will increase the probability of diverting loan proceeds for other purposes. In this case, the coefficient of the variable will be expected to have a positive sign.

c) Timeliness of Loan Disbursement

If loan is issued late from the point of view of the borrower, it is likely that the loan proceeds will be diverted to other purposes. In relation to this, Johnson and Rogaly (1997) argued that "the timeliness of loan disbursement is crucial when loans are being used for seasonal activities such as agriculture. If a program of seasonal loans is in place which farmers utilize to buy inputs or prepare land then complicated appraisal and approval procedures which might delay disbursement are unhelpful." Furthermore, they argued that this could in turn worsen the prospects of repayment by diverting loan to non-intended purpose. Thus, the sign of the variable in this case is expected to be positive. On the other hand, however, if the loan is disbursed on time from the point of view of the borrower, then it is likely that the probability of diverting the loan proceeds to non-intended purposes will be minimized. In this case, the variable may have a negative sign.

d) Size of Loan

A loan amount in excess of project cost is most likely to be diverted and will have a positive sign in this variable. On the other hand, the probability of diverting loans will be lower in the case where loan amount is just enough only to cover project costs i.e. negative sign in this variable may be expected. Similarly, it is true that loan smaller than the required amount would lead to loan diversion.

e) Use of Financial Records

If use of financial records is made, it will be easy for the borrower to follow up his/her loan utilization status. But if the case is otherwise, the borrower may confuse the loan proceeds with incomes/funds from other sources, thus getting into the possibility of a situation of unintentionally diverting loan proceeds to other purposes.

f) Other Sources of Income

With increased household income as a result of availability of other sources of income, the borrower may not divert the loan proceeds to other purposes, as the income may be enough to take care of these other purposes. Thus, this variable is expected to have a negative sign.

g) Educational Level of Beneficiary

With increase in the educational level of beneficiary, the probabilities of using the loan proceeds for its intended purpose will most likely increase. In some empirical studies it was found out that more educated beneficiaries tend to use the loan funds for the intended purpose than less educated ones (Kulundu, 1990). This may undermine loan diversion producing a negative sign in this variable. The opposite may however happen in the case where educated beneficiaries divert loan proceeds in search of a more profitable line of activity since the aspiration level of the educated ones seems to be relatively higher than those of the less educated ones.

As explained elsewhere above, loan diversion rate has been specified as influencing loan repayment performance and this variable is also dependent on some other factors implying endogeneity of loan diversion rate. Thus, this situation necessitates the use of a recursive model to address the issue of interdependence between this independent variable and the error term (which is an endogeneity problem). Kulundu (1990) used such a methodology in the study of Small-Holder Farmers Credit Repayment Performance in Kenya. The model consists of two equations. One that relates loan repayment performance and the factors that influence it, and the second one relates loan diversion and factors affecting it.

The loan repayment equation is modeled based on the following assumption. The assumption is that the decision of the i^{th} beneficiary whether to repay loan in full or not depends on an unobservable utility index (UI_i) which is explained by independent variables. However, since this utility index is unobservable utility or latent, there should be some mechanism which relates

this unobservable utility index to the actual decision of repaying loan in full or not. Therefore, this can be represented by defining a dummy variable which takes the value one when it is observed that the borrower pays in full, and zero otherwise. Since the institution (DECSI) retains 5 % from each approved loan as a group tax and deposits in a saving account with the institution against default, borrowers actually receive 95 % of the approved loan. Thus, a loan repayment rate of 95 % and above of the amount approved represents full repayment by a borrower. Those borrowers below this rate of repayment can be taken to have a repayment problem to fully repay within the specified loan repayment period. Accordingly, it is defined as follows.

$LRP_i = 1$ if $UI_i > 0$ (borrower repaid loan in full or attained
repayment rate of 0.95 or more);

$LRP_i = 0$ if $UI_i \leq 0$ (borrower did not pay loan in full or attained
repayment rate of less than 0.95)

where LRP_i = Loan repayment performance of the i^{th} borrower

UI_i = Utility index of the i^{th} borrower

Note that the utility index can lie anywhere between $-\infty$ and $+\infty$, while the probability of repaying in full or not must lie between 0 and 1.

The above consideration indicates that the dependent variable in the loan repayment equation is dichotomous or dummy dependent variable. Thus, the probit model is one of the models frequently used to deal with dichotomous variables, which is also used in this study to model loan repayment performance. Basically, the idea underlying the probit model is that our actual dependent variable of interest is unobservable or latent. For instance, if the observed dummy variable is whether or not to buy a car, then the latent variable is propensity or desire or ability to buy a car, which is unobserved. Similarly, the latent variable in this case is the utility from repayment and the dichotomous realization is whether or not a beneficiary has repaid in full. In probit model, the cumulative normal function is used. It is assumed that the error term $(\varepsilon) \sim IN(0, \delta^2)$. The model is non-linear and the parameters of the model are not marginal effects as is the case in other models.

The values of loan diversion rate are limited between zero and one. If loan diversion is full then loan diversion rate equals one. Partial loan diversion implies loan diversion rate anywhere between 0 and 1 where as no diversion means loan diversion rate equal to zero. Hence, in this case, the relevant and appropriate model to estimate the fitted value of LDR (Loan Diversion Rate) is the tobit model.

Thus, the probit and tobit models as defined in equations (1) and (2) below, respectively.

$$LRP = F(LDRH, \underline{MBI}, MOI, LSTOCK, FR, LS, TLD, SL, AGE, AGESQU, SEX, ED, U_1) \text{ -----(1)}$$

$$LDR = F(DR, LS, TLD, SL, FR, MOI, ED, U_2) \text{ -----(2)}$$

where LRP = Loan Repayment Performance (total loan paid to total loan supposed to be paid at a particular time)

LDR= Loan Diversion Rate (loan diverted to total loan received by borrower that is loan approved minus 5 % group tax.

LDRH= Fitted value of LDR

MBI =Monthly income from activities financed by the loan

Below 100 Birr =1

100 - 200 Birr =2

201 - 300 Birr =3

301 - 400 Birr =4

401 - 500 Birr =5

Above 500 Birr =6

MOI = Monthly income other than from activities financed by the loan (Birr)

LSTOCK = Value of livestock (in Birr³)

FR = Use of financial records

FR = 1 If a borrower uses financial records

= 0 Otherwise

LS = Beneficiary's perception on the sufficiency of the loan supervision from the institution and kebele/peasant association

LS = 1 If it was sufficient

= 0 Otherwise

SL= Size of loan i.e., loan amount that is approved to each beneficiary (Birr)

TLD=

Timeliness of loan Disbursement

TLD = 1 If loan issue was timely

= 0 Otherwise

DR = Dependency ratio

³ Average Price of Livestock: Cattle =Birr 614/head
Cow =Birr 562/head
Sheep =Birr 96/head
Goat =Birr 78/head
Donkey =Birr 222/head

Source: - Tigray Regional Bureau of Agriculture

ED = Beneficiaries level of education

Non-literate = 1

Read and write = 2

Grade 1-6 complete=3

Grade 7-8 complete=4

Grade 9-12 complete=5

Above grade 12 =6

AGE = Beneficiary's age (years)

AGESQ = Age squared

SEX= Beneficiary's sex

SEX = 1 Female

= 0 Male

U_1 = Error term of equation (1)

U_2 = Error term of equation (2)

U_1 and U_2 are assumed to be independently and normally distributed with mean zero and constant variances. It is also assumed that $\text{COV}(U_1, U_2) = 0$. The importance of this restriction is to ensure the non-existence of a simultaneous equation bias.

Both models are estimated using maximum likelihood estimation. There are three major reasons for using maximum likelihood estimation as compared to OLS (ordinary least square) method. When one applies the OLS method in dichotomous variable case, one usually faces the following major problems namely; non-normality of the disturbances, heteroscedastic variance of the disturbances, and the possibility of estimated probabilities lying outside the 0-1 range.

Since the loan diversion rate (LDR) variable has been identified to be endogenous, the fitted values of LDR has been considered. Accordingly, the endogenous variables are determined

sequentially. First, LDR in equation (2) is estimated and then its fitted value along with other explanatory variables is used to estimate LRP in equation (1).

Kulundu (1990) argued that recursive model is an appropriate estimation procedure to analyze the relative importance of the factors affecting loan repayment performance while avoiding the interdependence that may exist between explanatory variables (i.e., endogeneity problem). He further argued that a single equation model fails to explain the interdependence that exists between the explanatory variables. As a result of this he concluded that it is appropriate to employ a model consisting of a number of equations in which the behavior of the variables is jointly determined i.e., recursive model. Accordingly, a recursive model is applied in this study.⁴

⁴ Berhanu (1999) and Mengistu (1997) have also employed a similar model to determine the factors affecting loan repayment performance of POCSSB (the Project Office for the Creation of Small Scale Business Opportunities) and the Market Towns Development Project Micro-financing Scheme, respectively

CHAPTER 4 EMPIRICAL ANALYSIS

4.1 Characteristics of Sample Respondents

From the total beneficiaries in the sample sub-branches, 105 rural and 146 urban beneficiaries were selected for the survey as explained in the previous chapter. Of the total rural respondents, 58(55.2 %) are male while 47(44.8 %) are female and from the urban respondents 36(24.7 %) are male and 110(75.3 %) are female. Totally the sample respondents, 94(37.5 %) are male and 157(62.3 %) are female (see Table 4.1).

Table 4.1 Sample Respondents by Sex

Classification	Sex		Total
	Male	Female	
Rural	58	47	105
Urban	36	110	146
Total	94	157	251

When grouping the sampled borrowers in terms of full repayment and below full repayment rates, in the rural sample, we have 90 borrowers (85.7 %) who settled their loan in full and 15(14.3 %) borrowers who failed to pay in full. On the other hand, in the case of urban dwellers, the figure for borrowers with full repayment stands at 137 (93.8 %) and for below full repayment borrowers is only 9 (6.7 %). In relation to this, the mean full repayment rate is 85.7 % and 93.8 % for rural and urban, respectively. The average full repayment rate for both rural and urban together is 90.4 %. When comparing rural and urban, it indicates that rural beneficiaries have lower performance than urban beneficiaries. The main reason for low repayment performance for rural areas is loss of livestock and crop failure as a result of adverse weather conditions.

Table 4.2 Age Group of Sample Respondents

Age Range	Rural	Urban	Total
20-29	8	20	28
30-39	38	45	83
40-49	24	37	61
50-59	20	30	50
60-69	15	11	26
above 69	-	3	3
Total	105	146	251

The respondents highest age for rural beneficiaries is 68 years, the lowest is 20 years and the average age is 43 years while for urban beneficiaries the highest is 80 years, the lowest is 20 years and the average age is 42 years. The mean age for the whole is 42 years. Table 4.2 above shows that most i.e., 59 % of rural and 56 % of urban beneficiaries are in the age of 30-50 years while 57 % of the total sample are in this age group.

Table 4.3 Sample Beneficiaries Level of Education

Level of Education	Rural	Urban	Total
None	49	52	101
Read and Write	25	26	51
Grade 1-6	28	45	73
Grade 7-8	2	10	12
Grade 9-12	1	9	10
Above Grade 12	-	4	4
Total	105	146	251

The table above shows that the majority of the sample beneficiaries (i.e., 46.7 % of rural respondents, 35.6 % of urban respondents and 40.2 % of the total respondents) are illiterate. This may partially account for the poor financial records on the respondents. Based on this, among the sample beneficiaries, 88(83.8 %) of rural respondents and 86(58.9 %) of urban respondents do not use financial records. From 49 illiterate rural sample beneficiaries, 45 (92 %)

do not use financial records. Similarly, among 52 illiterate urban sample respondents, 41 (80 %) do not use financial records. Considering educational level, one can see that 30(28.5%) of rural respondents and 55(37.6 %) of urban sample respondents have completed grade 8. Comparing the two figures, it indicates the existence of more educated borrowers from urban respondents than rural ones as is naturally expected. In relation with this, it is observed that there are more financial record users in urban sample than rural sample as well.

The size of disbursement to the sample clients by DECSI ranged from Birr 500 to Birr 2500 for both rural and urban respondents in 1999. The mean loan amount per borrower in 1999 was Birr 1098 for rural sample beneficiaries, which is less than that of urban sample beneficiaries (Birr 1664) while the mean loan amount for the whole sample beneficiaries was Birr 1425. The sufficiency of this loan amount to cover project costs has implications for loan diversion and repayment performance. From the sample surveyed, 93.3 %, 75.3 % and 82.8 % of rural, urban and total sample beneficiaries respectively reported the sufficiency of the loan amount to cover project cost. On the other hand, 6.3 % from rural and 24.7 % from urban sample beneficiaries responded that the loan was insufficient. From this, one can observe that insufficiency of loan disbursed is a problem that exists more in urban than in rural since urban beneficiaries have better opportunities to utilize the loan in different economic activities and thus require more fund than the latter.

With respect to the credit utilization aspect of borrowers and taking only the activities in which most sample borrowers utilize the fund, 47.6 % of the rural respondents took credit for undertaking farming activities and 23.8 % for farming and livestock rearing together. Similarly,

45.9 % of urban respondents took credit for retail trade, 19.2 % for local drink preparation and 7.5 % for selling injera, bread etc, see Table 4.4 below. The figures above indicate that the largest share of rural beneficiaries utilized the loan for agricultural activities which is a highly vulnerable activity compared with urban clients who are more likely to have cash income activities such as retail trade and local drink preparation.

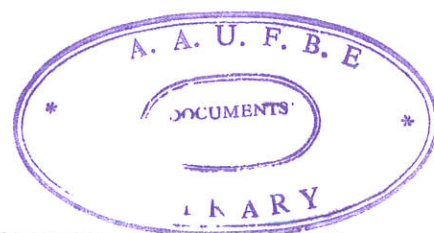


Table 4.4 Respondents Credit Utilization by Activities

Rural			Urban		
Activities	No.	%	Activities	No.	%
Farming	50	47.6	Local drink preparation	28	19.2
Livestock rearing	2	1.9	wood/metal works	3	2.1
Trade	4	3.8	Textile & related activities	8	5.5
Horticulture & farming	3	2.9	Hotel/restaurant/ snacks	9	6.2
Farming & livestock rearing	25	23.8	Retail trade	67	45.9
Farming & Trade	8	7.6	Selling Injera & bread	11	7.5
Others	13	12.4	Local Drink & Selling Injera	7	4.8
			Others	13	8.9
Total	105	100	Total	146	100

Rural respondents reported as making loan repayment biannually and annually while urban respondents reported every month. The repayment period was reported to be suitable by 92.4 %, 92.5 % and 92.46 %, respectively of the respondents from rural, urban and both taken together. A question of interest in this respect is the suitability of the loan repayment period, which fits the repayment capacity of beneficiaries, is expected to improve repayment performance. Since more than 92 % of the respondents for the three cases reported that the repayment period is suitable,

there is no significant variation to include the variable in the regression analysis. Thus, it is excluded from the model.

Availability of sufficient supervision (follow-up) on loan utilization and repayment are also important for improved loan repayment performance. Under this credit scheme, supervision is supposed to be provided by DECSI staff as well as Kebele/Peasant administrations. In connection with this, supervision on loan utilization and repayment both from DECSI and Kebele/Peasant administrations based on the survey is presented below.

Table 4.5 Respondents Perception on the Sufficiency of Supervision on Loan Utilization and Loan Repayment

Source &Type of Supervision	Perception on Sufficiency					
	Rural		Urban		Total	
	No	Yes	No	Yes	No	Yes
DECSI's Supervision on Loan Utilization	2	103	9	137	11	240
Kebele/Peasant Administrations Supervision on Loan Utilization	11	94	43	103	54	197
DECSI's Supervision on Loan Repayment	1	104	14	132	15	236
Kebele/Peasant Administrations Supervision on Loan Repayment	13	92	44	102	57	194

From the table above it is possible to observe that the supervision from DECSI was more than that from Kebele/Peasant associations. Also, 98(93.3 %) rural and 134 (91.8 %) urban sample beneficiaries reported that the supervision in general is sufficient while 7(6.7 %) of rural and 12(8.2 %) of urban responded the supervision as insufficient. Even from the informal discussions, most beneficiaries indicated that they are satisfied with the advice and supervision given by both DECSI and Kebele/Peasant administration.

It is also found that 28(26.7 %) of rural, 47(32.2 %) of urban and 75(30 %) of the whole sample beneficiaries were diverters i.e., they used the loan they received to purposes other than that what the beneficiaries agreed with DECSI. This also indicates the execution of slightly more non-intended activities by borrowers in urban than in rural. Of the loan diverters 26(92.9 %) of rural, 46(97.9 %) of urban and 72(96 %) of the whole sample beneficiaries reported their reasons of loan diversion. The main reason for loan diversion was that they used for household living expenses namely, medical expenses, school fees, consumption expenses etc., which accounted for 19(73 %) for rural, 33(71.7 %) for urban and 52(72.2 %) for the whole sample. It is also found that 8.3 %, 9.6 % and 9.2 % of the total loan funds given to the rural, urban and both sample beneficiaries, respectively was diverted to other uses.

The existence of diverted loan provides a good cause for investigating what factor influences the borrowers to divert the loan funds. With reference to this aspect, some sample beneficiaries interviewed complained of having received the loan late. According to the outcome of the survey, 10(9.5 %) of the respondents from rural sample, 15(10.3 %) of the respondents from urban sample and 25(10 %) from the whole sample reported to have received loan later than the planned time. Out of the 25 sample beneficiaries who received loan not on time, 7(40 %) from rural, 3(20 %) from urban and 10(40 %) from the whole sample reported the delay as having an impact on their planned activities.

The survey result reported that all the sample beneficiaries have the attitude that loan should be repaid. In many empirical studies, attitude of beneficiaries towards loan repayment is considered as an important variable affecting loan repayment performance. However, in this study since the

whole sample beneficiaries responded the attitude that the loan should be repaid, the regression result becomes regression over a constant. Thus, it is excluded in the loan repayment performance equation.

Nearly, 97(92 %) of rural, 31(90 %) of urban and 228(91 %) of the whole sample beneficiaries reported as not having previous access to credit at the time of the survey. As a result of this, it becomes impossible to undertake evaluation on beneficiaries' experience in loan use and their default behavior.

The variable representing beneficiary's attitude to cost of default is another variable of concern in this study. Accordingly, 85(81 %) from rural, 146(100 %) from urban and 231(92 %) from both consider the cost of default as high (see Table 4.6). Similar to beneficiary's attitude to loan repayment, beneficiary's attitude to cost of default is excluded from the regression since there is no significant variation.

Table 4.6 Respondents Attitude to cost of Default

Respondents attitude to cost of default	Rural		Urban		Total	
	Number	%	Number	%	Number	%
Cost of default is high	85	81	146	100	231	92
cost of default is low	20	19	-	-	20	8
Total	105	100	146	100	251	100

Looking particularly at livestock owning in rural sample borrowers, 94.3 % of the sampled beneficiaries have livestock that comprises either oxen, cows, sheep, goats, and donkeys or a combination of two or more of these livestock types. In other words, in terms of wealth, livestock can be considered as a proxy for representing wealth. Thus, borrowers that have more

livestock may have better loan repayment performance since the borrower can sell his/her livestock when he/she faces negative income shocks.

Dependency ratio is another important variable that we have in our discussion concerning loan diversion. The mean range of dependency ratio is 60 % for rural, 61.1 % for urban and 60.6 % for the whole sample respondents.

In order to see the means of additional income that the beneficiaries have, which can help the borrower to perform good repayment, the respondents were asked if they have other source of income. Accordingly, 59(56.2 %) for rural and 41(28.1 %) for urban have other source of income which ranges from Birr 20 to 300 a month in the case of rural and from Birr 18 to 400 a month in respect of urban dwellers.

4.2 Impact Assessment of DECSI's Credit Scheme

4.2.1 Effect on Income

One of the immediate impacts of having access to credit from a microfinancing program is on income. This induced income may have impact on other outcomes such as consumption, nutrition, education, health, etc. In general, nearly 89.5 % of rural and 87 % of urban respondents voted "yes" in favor of better life after loan than before loan. The findings reported elsewhere above demonstrate that the DECSI credit has a positive effect. Therefore, an attempt is made to quantify this effect from information collected through the survey. Since usually

borrowers do not keep records on their business/activities, the income figures may not be accurate. They will however, to a great extent, serve the intended purpose. Related with income before loan, about 85.7 % of rural and 72.6 % of urban respondents reported the existence of income source before participating in the program. Of those reported, 100 %(rural) and 81.1 %(urban) responded the source of income. The major source of income for rural respondents is farming (78.9 %) and for urban retail trade (32.6 %)-see Tables 4.7 and 4.8. On the other hand, among respondents who have income source before loan, 100 %(rural) and 85.8 %(urban) disclosed the level of income.

Table 4.7 Rural Respondents by Source of Income before Loan

Source of Income	Number of Respondents	%
Farming	71	78.9
Daily Labor	3	3.3
Farming & Daily Labor	5	5.6
Others	11	12.2
Total	90	100

Table 4.8 Urban Respondents by Source of Income before Loan

Source of Income	Number of Respondents	%
Local drink Preparation	19	22.1
Retail Trade	28	32.6
Permanent Employee	16	18.6
Others	23	26.7
Total	86	100

In terms of range, among those rural beneficiaries that disclosed level of income, 34.4 % reported monthly income below Birr 100 and 51.2 % between Birr 100-200 before loan. Similarly, 25.3 % of urban respondents reported monthly income of below Birr 100 and 54.9 % between Birr 100-200 before loan (see Tables 4.9 and 4.10).

On the other hand, all beneficiaries reported their household monthly income after program participation, which includes income from activities financed by the loan from DECSI and other income sources side by side of their major activities. Out of those beneficiaries, 28.6 % of rural beneficiaries have monthly income less than Birr 100 and 35.2 % between Birr 100-200. Similarly, 43.8 % of urban beneficiaries have income below Birr 100 and 24.7 % between Birr 100-200. Besides, only 3.3 % (rural) and 9.9 % (urban) beneficiaries reported a monthly income greater than Birr 300 before loan and these figures rose to 18.1 % (rural) and 18.5 % (urban) after loan (see Tables 4.9 and 4.10).

Table 4.9 Rural Respondents by Level of Income

Income Level (Birr)	Before Loan		After Loan	
	Beneficiaries Number	Percent	Beneficiaries Number	Percent
Below100	31	34.4	30	28.6
100-200	46	51.2	37	35.2
201-300	10	11.1	19	18.1
301-400	3	3.3	9	8.6
401-500	-	-	6	5.7
Above 500	-	-	4	3.8
Total	90	100	105	100

Table 4.10 Urban Respondents by Level of Income

Income Level (Birr)	Before Loan		After Loan	
	Beneficiaries Number	Percent	Beneficiaries Number	Percent
Below 100	23	25.3	64	43.8
100-200	50	54.9	36	24.7
201-300	9	9.9	19	13
301-400	5	5.5	12	8.2
401-500	1	1.1	5	3.5
Above 500	3	3.3	10	6.8
Total	91	100	146	100

The above results suggest the positive contribution of the credit scheme in income generating. However, the income effect of the credit scheme should be analyzed by comparing income before and after loan. This requires hypothesis testing by formulating the null and the alternative.

Test of hypothesis can be classified in to two: parametric (standard) tests and non-parametric (distribution free) tests. In parametric test we assume certain properties of the parent population from which we draw sample while there is no need for such assumption in non-parametric test (Van Matre, 1996).

As non-parametric test doesn't require assumption about a particular distribution and considering the need to compare income before and after loan disbursement, Wilcoxon Matched Pairs non-parametric test is employed in the study. This is because Wilcoxon test for paired samples is appropriate in comparative experiments when the measurements are the "before and after" on the same experimental unit (Van Matre, 1996). In order to apply this test, we first find the differences between each observed value and rank the differences in order of absolute magnitude; the smallest absolute difference will be given rank one. If there are ties in the difference (i.e., if the difference happens to be zero), the observation will be dropped and the sample size will be reduced accordingly. The actual signs of each differences are then put to corresponding ranks and the sum of the positive ranks, symbolized by T^+ , or the sum of the negative ranks, T^- are computed. The test statistic will be either T^+ or T^- depending on the alternative hypothesis. If a variable Z is observed before and after a certain policy, symbolized by Z_b and Z_a respectively, then the alternative hypothesis and the test statistic becomes:

<u>Alternative Hypothesis</u>	<u>Test Statistic</u>
H1: $Z_a < Z_b$	T+
H1: $Z_a > Z_b$	T-
H1: $Z_a \neq Z_b$	Smaller of T+ or T-

The null hypothesis will be rejected if the test statistic is equal to or less than the critical value given in W tables (i.e. Wilcoxon tables shown in standard statistical textbooks for number of observation $(n) \leq 25$). For $n > 25$ the distribution of both T+ and T- can be considered normal with mean μ_T and standard deviation σ_T defined as:

$$\mu_T = \frac{n(n+1)}{4}$$

$$\sigma_T = \sqrt{\frac{n(n+1)(2n+1)}{24}}$$

So $Z = (T - \mu_T) / \sigma_T$ is the test statistic.

In this study, average monthly total income before and after loan are denoted by TIBL and TIAL, respectively, the null and alternative hypothesis can be specified as:

H_0 : Average monthly total income before and after loan is the same i.e. $TIBL = TIAL$

H_1 : Average monthly total income after loan is greater than before loan i.e $TIAL > TIBL$

Accordingly, the following test results for rural, urban and both are obtained using SPSS (release 6.0):

a) Rural Sample Beneficiaries

- - - - Wilcoxon Matched-Pairs Signed-Ranks Test
TIAL Average monthly total income after loan
with TIBL Average monthly total income before loan

Mean Rank	Cases
42.95	64 - Ranks (TIBL LT TIAL)
23.75	14 + Ranks (TIBL GT TIAL)
	12 Ties (TIBL EQ TIAL)

	90 Total
Z = -6.0167	2-Tailed P = .0000

b) Urban Sample Beneficiaries

- - - - Wilcoxon Matched-Pairs Signed-Ranks Test

TIAL Average monthly total income after loan
with TIBL Average monthly total income before loan

Mean Rank	Cases
43.68	65 - Ranks (TIBL LT TIAL)
40.80	20 + Ranks (TIBL GT TIAL)
	6 Ties (TIBL EQ TIAL)

	91 Total
Z = -4.4322	2-Tailed P = .0000

c) **Both Rural and Urban Sample Beneficiaries Together**

- - - - Wilcoxon Matched-Pairs Signed-Ranks Test

 TIAL Average monthly total income after loan(Birr)
with TIBL Average monthly total income before loan (Birr)

Mean Rank	Cases
86.03	129 - Ranks (TIBL LT TIAL)
66.72	34 + Ranks (TIBL GT TIAL)
	18 Ties (TIBL EQ TIAL)

	181 Total

Z = -7.3147 2-Tailed P = .0000

The above test result leads to the rejection of the null hypothesis at 1% significance level for the three cases indicating that the average monthly total income after loan is significantly greater than that before loan. Thus, we can say that DECSI's microfinancing scheme has a positive impact on income.

4.2.2 Effect on Access to Educational Facilities

The other variable that is presented in this study to assess the impact of DECSI's credit scheme is access to educational facilities. As such beneficiaries were asked on the amount they spend for education both before and after the loan. However, they could not even estimate the expenses

and as a result educational expenditures before and after loan is dropped out from the analysis. Instead, enrollment of school age is considered to assess the impact of credit scheme in improving access to educational facilities. Some 40 %(rural) and 49.3 %(urban) clients reported enrollment of school age dependents before loan. These figures rose to 70.5 %(rural) and 54.8 %(urban) after loan (see Tables 4.11 and 4.12)

Table 4.11 Rural Respondents Enrollment of School-age Dependents

Number of school-age dependents enrolled	Before Loan		After Loan	
	Number of Respondents	%	Number of Respondents	%
1	19	45.3	36	48.6
2	14	33.3	22	29.7
3	9	21.4	8	10.8
4	-	-	7	9.5
5	-		1	1.4
Total	42	100	74	100

Table 4.12 Urban Respondents Enrollment of School-age Dependents

Number of school-age dependents enrolled	Before Loan		After Loan	
	Number of Respondents	%	Number of Respondents	%
1	18	25	21	26.3
2	24	33.3	24	30
3	12	16.7	16	20
4	9	12.5	10	12.5
5	5	6.9	5	6.3
6	1	1.4	-	-
7	2	2.8	3	3.8
8	1	1.4	1	1.3
Total	72	100	80	100

Wilcoxon non-parametric test is employed to assess the above response i.e., increase in the number of enrollment of school-age dependents after program participation. To accomplish this, let's represent ESCADBL and ESCADAL as enrollment of school-age dependents before and after loan respectively. Accordingly, the null and alternative hypotheses are :-

H_0 : Number of enrollment of school-age dependents before loan is the same as after loan

H_1 : Number of enrollment of school-age dependents after loan is greater than before loan.

Thus, the following test results for the three cases are obtained using SPSS

a) **Rural Sample Beneficiaries**

----- Wilcoxon Matched-Pairs Signed-Ranks Test

ESCADAL Enrollment of school age family dependents after loan
with ESCADBL Enrollment of school age family dependents before loan

Mean Rank	Cases
12.17	18 - Ranks (ESCADBL LT ESCADAL)
8.50	4 + Ranks (ESCADBL GT ESCADAL)
	19 Ties (ESCADBL EQ ESCADAL)

	41 Total
Z = -3.0031	2-Tailed P = .0027

b) Urban Sample Beneficiaries

----- Wilcoxon Matched-Pairs Signed-Ranks Test

ESCADAL Enrollment of school-age family dependants after loan
with ESCADBL Enrollment of school-age family dependants before loan

Mean Rank	Cases
14.34	19 - Ranks (ESCADBL LT ESCADAL)
17.50	11 + Ranks (ESCADBL GT ESCADAL)
	36 Ties (ESCADBL EQ ESCADAL)

66	Total

Z = -.8227 2-Tailed P = .4107

c) Both Rural and Urban Sample Beneficiaries Together

----- Wilcoxon Matched-Pairs Signed-Ranks Test

ESCADAL Enrollment of school-age family dependants after loan
with ESCADBL Enrollment of school-age family dependants before loan

Mean Rank	Cases
26.09	37 - Ranks (ESCADBL LT ESCADAL)
27.50	15 + Ranks (ESCADBL GT ESCADAL)
	55 Ties (ESCADBL EQ ESCADAL)

107	Total

Z = -2.5181 2-Tailed P = .0118

The test results except urban sample beneficiaries show the rejection of the null hypothesis almost at 1 % level of significance. This indicates that the number of enrollment of school-age dependents after loan is significantly greater than before loan. On the other hand, the test result

for urban beneficiaries indicates that the hypothesis is not rejected implying that the credit scheme has no positive contribution in increasing the number of enrollment of school-age dependents after loan. This is explicable in terms of the possibility that perhaps a certain level of access to education may have already been reached before loan compared to that of rural as is normally expected.

In relation to the overall opinion on educational facilities, nearly 72.4 %(rural) and 76 % (urban) of the respondents reported in favor of improved access to educational facilities. The remaining 27.6 %(rural) and 24 % (urban) of sample beneficiaries however reported as the program having no improvement on access to educational facilities. From this, therefore, one may attribute the positive trends observed as a result of DECSI intervention.

4.2.3 Effect on Access to Medical Facilities

Respondents were asked to recall their average medical expenditures. However, similar to educational expenditures, the respondents were not able to estimate the expenditure though they reported the bearer of their medical expenditures. Thus, access to medical facilities before loan and after loan is considered to assess the impact on medical facilities. Out of 105 rural and 146 urban sample respondents, 92.4 %(rural) and 94.5 %(urban) said that they had access to medical facilities before loan. On the other hand, 98 %(rural) and 97.3 %(urban) have access to medical facilities after loan (see Table 4.13).

Table 4.13 Responses on Access to Medical facilities (No. of Respondents)

Beneficiaries Response	Rural		Urban	
	Before Loan	After Loan	Before Loan	After Loan
No	8	2	8	4
Yes	97	103	138	142
Total	105	105	146	146

As is shown in the table above, the response on access to medical facilities has increased after loan compared with before loan for rural as well as urban respondents. A much higher proportion of rural as well as urban respondents reported that medical expenditures have been covered by him/herself. Nearly 89.5 %(rural) and 85.2 %(urban) respondents reported that they covered medical expenditures by himself/herself before loan. Similarly, 98.1 %(rural) and 90.4 %(urban) covered their medical expenditures by himself/herself after loan (see Table 4.14).

Table 4.14 Responses on Bearer of Medical Expenditure (No. of Respondents)

Bearer	Rural		Urban	
	Before Loan	After Loan	Before Loan	After Loan
By him/herself	94	101	121	132
Other family members	-	1	2	-
Free user	3	1	19	11
Total	97	103	142	143

Observing the above table, number of respondents who covered his/her medical expenditures by him/herself has increased in both rural and urban cases while number of free users have reduced after loan suggesting that people are taking care of themselves independently after the loan. To check the impact on access to medical facilities, therefore, Wilcoxon non-parametric test is employed. Accordingly, access to medical facilities before and after loans are represented by AMFBL and AMFAL, respectively.

The null and alternative hypotheses are as follows:

H_0 : Access to Medical facilities before Loan is the same as after Loan
i.e., $AMFBL=AMFAL$

H_1 : Access to Medical Facilities after loan is better than before Loan
i.e., $AMFAL >AMFBL$

The test result using SPSS for the three cases are presented below.

a) **Rural Sample Beneficiaries**

----- Wilcoxon Matched-Pairs Signed-Ranks Test
AMFCAL access to medical facilities after loan
with AMFCBL access to medical facilities before loan

Mean Rank	Cases
4.00	7 - Ranks (AMFCBL LT AMFCAL)
.00	0 + Ranks (AMFCBL GT AMFCAL)
97	Ties (AMFCBL EQ AMFCAL)

104	Total
Z = -2.3664	2-Tailed P = .0180

b) Urban Sample Beneficiaries

----- Wilcoxon Matched-Pairs Signed-Ranks Test

AMFCAL access to medical facilities after loan
with AMFCBL access to medical facilities before loan

Mean Rank	Cases
68.00	135 - Ranks (AMFCBL LT AMFCAL)
.00	0 + Ranks (AMFCBL GT AMFCAL)
	7 Ties (AMFCBL EQ AMFCAL)

142 Total

Z = -10.0809 2-Tailed P = .0000

c) Both Rural and Urban Sample Beneficiaries Together

----- Wilcoxon Matched-Pairs Signed-Ranks Test

AMFCAL access to medical facility after loan
with AMFCBL access to medical facilities before loan

Mean Rank	Cases
116.50	231 - Ranks (AMFCBL LT AMFCAL)
116.50	1 + Ranks (AMFCBL GT AMFCAL)
	14 Ties (AMFCBL EQ AMFCAL)

246 Total

Z = -13.0912 2-Tailed P = .0000

Since the p-value for the three cases are less than 0.05, the result indicates the rejection of the null at 5 %(rural) and 1 %(urban and the whole sample together). Therefore, access to medical facilities after loan is better than before loan.

4.2.4 Effect on Household Diet (Nutritional Status)

The other impact of having access to credit from a microfinancing program is on household diet. The immediate impact of microfinance program is on income and this induced income is expected to have an impact on another outcome like increase in consumption expenditure that leads to better household diet and living condition. Since it is difficult to quantify the change in household diet, consumption expenditure before and after loan is used as a proxy to evaluate the effect of the credit scheme on household diet (nutrition) in this analysis. Thus, comparing consumption expenditure before and after loan will serve to assess the improvement of the household diet of beneficiaries.

Related with consumption expenditure before loan, all respondents disclosed the level of consumption expenditure. About 56.2 %(rural) and 43.2 %(urban) sample respondents reported consumption expenditure below Birr 100 and 30.5 %(rural) and 29.5 %(urban) reported consumption expenditure between Birr 100-200. Considering the situation after loan, nearly 30.5 %(rural) and 26.7 %(urban) reported below Birr 100; and 45.7 %(rural) and 30.1 %(urban) reported consumption expenditure of Birr 100-200(see Tables 4.15 and 4.16).

Table 4.15 Consumption Expenditure of Rural Sample Respondents

Consumption Expenditure (Birr)	Before Loan		After Loan	
	Number of respondents	%	Number of respondents	%
Below 100	59	56.2	32	30.5
Between 100-200	32	30.5	48	45.7
Between 201-300	9	8.6	12	11.4
Between 301-400	3	2.9	10	9.5
Between 401-500	1	1.0	2	1.9
Above 500	1	1.0	1	1.0
Total	105	100	105	100

Table 4.16 Consumption Expenditure of Urban Sample Respondents

Consumption Expenditure (Birr)	Before Loan		After Loan	
	Number of respondents	%	Number of respondents	%
Below 100	63	43.2	39	26.7
Between 100-200	43	29.5	44	30.1
Between 201-300	22	15.1	37	25.3
Between 301-400	10	6.8	16	11.0
Between 401-500	4	2.7	4	2.7
Above 500	4	2.7	6	4.1
Total	146	100	146	100

The tables above show that the mean consumption expenditure of rural sample respondents after loan was greater by 27.1 % compared with before loan. Similarly, the mean consumption expenditure of urban sample respondents after loan was higher by 20 % compared with before loan. From this, it can be observed that there is a rise in consumption expenditure on a number of beneficiaries.

On the other hand, concerning bearer of consumption expenditure, a much higher proportion of the sample respondents reported that they are bearers of consumption expenditure. Accordingly, 86.7 %(rural) and 89.7 %(urban) of the respondents covered his/her consumption expenditures by him/herself before loan. These figures rose to 90.5 %(rural) and 91.8 %(urban) after loan indicating that more people are becoming their own bread winners as a result of the loan (see Tables 4.17 and 4.18).

Table 4.17 Bearer of Consumption Expenditure in Rural Sample Respondents

Bearer of Consumption Expenditure	Before Loan		After Loan	
	Number of respondents	%	Number of respondents	%
Beneficiaries him/herself	91	86.7	95	90.5
Beneficiaries and other family members	6	5.7	4	3.8
Beneficiaries and donors	8	7.6	6	5.7
Total	105	100	105	100

Table 4.18 Bearer of Consumption Expenditure in Urban Sample Respondents

Bearer of Consumption Expenditure	Before Loan		After Loan	
	Number of respondents	%	Number of respondents	%
Beneficiaries him/herself	131	89.7	134	91.8
Beneficiaries and other family members	6	4.1	6	4.1
Beneficiaries and donors	8	5.5	6	4.1
Other family members	1	0.7	-	-
Total	146	100	146	100

From informal discussions with beneficiaries, the sample respondents reported that DECSI's credit scheme has made great contribution on the improvement of their lives.

Therefore, Wilcoxon non-parametric test is employed to qualify the response indicated above i.e., improvement in household diet after program participation.

Let CEBL is average monthly consumption expenditure before loan (Birr) and CEAL is average monthly consumption expenditure after loan (Birr). Accordingly, the null and alternative hypotheses are: -

H0 : Average monthly consumption expenditure before loan is the same as after loan i.e., $CEBL=CEAL$

H1 : Average monthly consumption expenditure after loan is the higher than before loan i.e., $CEAL > CEBL$

The estimated test results for the three cases using SPSS is presented below.

a) Rural Sample Beneficiaries

- - - - Wilcoxon Matched-Pairs Signed-Ranks Test

CEAL average monthly consumption expenditure after loan
with CEBL average monthly consumption expenditure before loan

Mean Rank	Cases
27.14	49 - Ranks (CEBL LT CEAL)
31.00	5 + Ranks (CEBL GT CEAL)
	51 Ties (CEBL EQ CEAL)

105	Total

Z = -5.0585 2-Tailed P = .0000

b) Urban Sample Beneficiaries

----- Wilcoxon Matched-Pairs Signed-Ranks Test

CEAL average monthly consumption expenditure after loan
with CEBL average monthly consumption expenditure before loan

Mean Rank Cases

29.21 54 - Ranks (CEBL LT CEAL)

42.08 6 + Ranks (CEBL GT CEAL)

86 Ties (CEBL EQ CEAL)

146 Total

Z = -4.8771 2-Tailed P = .0000

c) Both Rural and Urban Sample Beneficiaries Together

----- Wilcoxon Matched-Pairs Signed-Ranks Test

CEAL average monthly consumption expenditure after loan
with CEBL average monthly consumption expenditure before loan

Mean Rank Cases

55.82 103 - Ranks (CEBL LT CEAL)

73.27 11 + Ranks (CEBL GT CEAL)

137 Ties (CEBL EQ CEAL)

251 Total

Z = -6.9879 2-Tailed P = .0000

At 1 percent level of significance, the test result leads to the rejection of the null hypothesis for the three cases i.e., the average consumption expenditure after loan is greater than before loan.

Concerning the overall trends of the respondents in their living conditions, 77.1 %(rural) and 74.7 %(urban) reported "yes" in favor of an improving trend in household diet after program participation. The other 19 %(rural) and 23.3 %(urban) reported no change while the remaining 3.9 %(rural) and 2.1 %(urban) reported declining trends of household diet in the last three years i.e., after program participation.

The above results suggest that DECSI's credit scheme has contributed a lot in improving household diet in particular and the living conditions of the beneficiaries in general.

4.2.5 Effect on Savings

Khandker et al. (1995) argued that savings foster financial discipline and helps borrower smooth out consumption if they incur income losses due to production failure. In relation to this, there are two types of savings in the credit scheme under discussion. The first one is a compulsory saving which is normally enforced and starts simultaneously with the loan that is approved for an individual. All borrowers pay this from the beginning up to the end of credit processing and repayment cycle. On the other hand, voluntary saving is an individual saving which depends on the willingness of the individual to save and withdraw at any time when the need arises. Therefore, for this analysis voluntary saving is considered to assess the impact of the credit

scheme on saving since all credit beneficiaries attend the compulsory saving (whether they like it or not) which is constant in amount for all beneficiaries.

About 1.9 % (rural) and 11 % (urban) of the sample respondents had have saving account before loan. However, a significant number of respondents have made saving after loan compared with before loan i.e., 62.9 %(rural) and 45.2 %(urban)-(see Tables 4.19 and 4.20). The average monthly saving after loan for rural beneficiaries is from Birr 3 to Birr 200 while for urban from Birr 5 to Birr 400.

Table 4.19 Rural Sample Responses on Having Saving Account

Response on having saving account	Before Loan		After Loan	
	Number of respondents	%	Number of respondents	%
No	103	98.1	39	37.1
Yes	2	1.9	66	62.9
Total	105	100	105	100

Table 4.20 Urban Sample Responses on Having Saving Account

Response on having saving account	Before Loan		After Loan	
	Number of respondents	%	Number of respondents	%
No	130	89	80	54.8
Yes	16	11	66	45.2
Total	146	100	146	100

As shown in the tables above, the result is showing an increase in the number of beneficiaries having saving account. Since the number of respondents having saving account before loan were very small i.e., 2(rural) and 16(urban), it is not suitable to conduct non-parametric test. The results indicated in the tables above, however, suggest positive changes. In any case, this is the most important area that needs much effort from DECSI's side because it is an alternative source

of credit for borrowers and helps to gradually minimize the institution's dependency on outside source.

If the amount of loans disbursed is considered as its lending capacity, the source of fund for lending which was limited only to the donors has been improving since 1994. In 1994, it was about 6.5 percent of the total loan disbursed covered from savings. However, in 1998 the percentage has raised to 27.3 percent. This could show that the institution's dependency on donors' funds is reduced (see Appendices 3 and 4).

Overall, it is clear from this impact study that DECSI has made a positive contribution to the alleviation of poverty in the region. The sample respondents also confirm this contribution by reporting that 89.5 %(rural) and 87 %(urban) have attained better life after joining the program and they stressed this improvement in the group discussion as well. One may not, however, attribute the entire positive contribution observed to DECSI alone. Rather other factors also had their own share i.e., development efforts of the different bodies in the region particularly in rural development, favorable weather, price rise, etc., to cite but a few examples.

This study, therefore, has highlighted that the credit scheme has made its own positive contribution on the beneficiaries in relation to income, access to educational facilities, medical facilities, household diet and saving except access to educational facilities for urban sample beneficiaries. That is also what the beneficiaries said in the informal group discussion.

As regards the success in the activities of borrowers with the loan they received, the respondents also reported that they faced some constraints on the performance of their activities. Of the rural respondents, 18(17.1 %) reported bad weather, 13(12.4%) lack of capital, and 11(10.5 %) bad weather and lack of capital together as major constraints to the performance of their activities. On the other hand, urban respondents indicated that 45(30.8 %) faced lack of market, 24(16.4 %) lack of capital and 8(5.8 %) lack of suitable working premises as major constraints. This indicates that there should be a mechanism that can solve the problems when it becomes beyond the beneficiary's control. Thus, the institution should try to incorporate ways and means in order to help beneficiaries when they faced such problems, for instance, when there is a sudden loss of assets like livestock, the occurrence of drought etc. Even from the informal discussions, the beneficiaries pointed out that there should be some ways of solving such problems by employing things like extending of credit settlement, for instance, when they faced problems beyond their control such as drought, sudden death of livestock, etc.

In relation to the question on the overall opinion of beneficiaries on the program, 102(97.1 %) of rural and 133(93.2 %) of urban respondents voted that the program is nice and it should be continued. Besides, the respondents highlighted some suggestions on means of improving the program. Among the rural beneficiaries, 11(10.5 %) suggested if the loan repayment can be extended from one year to two years, 10(9.5 %) noted if loan can be given to individuals instead of only to groups, while 43(41 %) have not given any suggestion at all. In relation with this, 22(15.1 %) suggested if the loan can be made available to individuals instead of only to teams, 16(11 %) indicated if the loan amount can be raised, and 70(47.9 %) have no idea on the program as regards urban respondents.

Besides to the questionnaire, informal group discussion with the beneficiaries was conducted. Some of the issues raised by the beneficiaries in relation to the suggestion given above are individual responsibility of loans and the issue of loans in small amount. However, with regard to the issue of the small amount of loans something should be done with the availability of fund, the viability of borrowers, and the viability of the institution. On the other hand, the issue that if the loan is given to individuals instead of only to groups will not work for such type of credit schemes since the target of the scheme is to provide credit for the poor who do not have access to formal credit due to lack of collateral. As a result of this, group lending is considered by a financial institution like DECSI as a lending system in order to minimize risk and attain high repayment performance. Otherwise, there is a need for redesigning the objective, target and strategy of the program.

From the informal discussion also, rural respondents particularly suggested that the repayment period should be on a period in which the price of agricultural products are favorable since the price of products during harvesting season is not attractive.

4.3 Determinants of Loan Repayment Performance

The full loan repayment rate for rural and urban sample beneficiaries has been found to be 85.7 % and 93.8 % respectively and 90.4 % for the whole sample beneficiaries. As discussed elsewhere above, there are several factors that determine full loan repayment performance. But what is the significance of each of these factors in determining the loan repayment performance? In connection with this recursive model is employed as an estimation procedure to identify the

determinants of loan repayment performance. Accordingly, two structural equations are estimated using an econometrics computer package (LIMDEP). In a recursive model, the endogenous variables are determined sequentially. We follow this sequence in estimating our model. First, LDR (equation 2) is estimated and use the fitted result for LDR, together with the other explanatory variables to estimate loan repayment performance (LRP) in equation 1. Since heteroscedasticity problem is highly associated with cross sectional data, i.e., when the disturbance term is not constant across observations, care must be taken to correct it. Accordingly, it has been detected that the loan diversion model has no heteroscedasticity problem and the results obtained for the three cases namely; for rural, urban and the whole sample beneficiaries are presented in Tables 4.21, 4.22 and 4.23, respectively.

Table 4.21 Estimates of Tobit Model for Loan Diversion Equation for Rural Sample Beneficiaries

Variable	Coefficient	Z-Value	P> Z
Constant	-0.632	-1.341	0.180
ED	0.036	0.531	0.595
DR	0.753	2.192	0.028
SL	0.0004	0.300	0.764
TLD	-0.171	-0.916	0.360
LS	-0.345	-1.706	0.088
FR	-0.004	-0.022	0.982
MOI	-0.001	-1.047	0.295
Sigma	0.452	6.352	0.000
Log likelihood	-46.13		
Restricted log likelihood	-53.55		
LR Chi2(7)	14.83		
McFadden's R ²	0.138		
Number of Observations	105		

Note: -McFadden R² = 1-LnL/LnL₀
where LnL = Unrestricted log likelihood
LnL₀ = Restricted log likelihood

Table 4.22 Estimates of Tobit Model for Loan Diversion Equation for Urban Sample Beneficiaries

Variable	Coefficient	Z-Value	P> Z
Constant	0.805	2.111	0.035
ED	0.017	0.514	0.607
DR	-0.248	-1.299	0.194
SL	-0.004	-4.426	0.000
TLD	0.110	0.404	0.686
LS	-0.352	-1.788	0.074
FR	-0.028	-0.260	0.795
MOI	-0.002	-2.688	0.007
Sigma	0.483	8.458	0.000
Log likelihood	-76.53		
Restricted log likelihood	-92.83		
LR Chi2(7)	32.6		
McFadden's R ²	0.176		
Number of Observations	146		

Note: $-McFadden R^2 = 1 - LnL / LnL_0$
where LnL = Unrestricted log likelihood
 LnL_0 = Restricted log likelihood

Table 4.23 Estimates of Tobit Model for Loan Diversion Equation for the Whole Sample Beneficiaries

Variable	Coefficient	Z-Value	P> Z
Constant	-0.073	-0.301	0.763
ED	0.006	0.197	0.844
DR	-0.043	-0.244	0.807
SL	0.484	3.880	0.000
TLD	-0.074	-0.459	0.647
LS	-0.243	-1.690	0.091
FR	-0.007	-0.072	0.943
MOI	-0.001	-2.366	0.018
Sigma	0.532	10.440	0.000
Log likelihood	-140.303		
Restricted log likelihood	-148.026		
LR Chi2(7)	15.45		
McFadden's R ²	0.052		
Number of Observations	251		

Note: $-McFadden R^2 = 1 - LnL / LnL_0$
where LnL = Unrestricted log likelihood
 LnL_0 = Restricted log likelihood

The overall estimated models are statistically significant at 5 %, 1 %, and 5 % for rural, urban and the whole sample beneficiaries, respectively.

As shown in the tables above, loan diversion rate is negatively related to loan supervision, use of financial records and other sources of income for the three cases, which are consistent with our expectation. Loan supervision is statistically significant at 10 % level of significance for the three cases while other sources of income is significant only for urban and the whole sample cases with 1 % and 5 % level of significance respectively. On the other hand, use of financial records has the expected signs but insignificant for the three cases.

The above results indicate that adequate loan supervision and advice have contributed to minimizing loan diversion to non-income generating purposes. Similarly, a beneficiary with other source of income may not divert loan funds as much as those without other sources of income.

Level of education has unexpected sign (positive) but statistically insignificant for the three cases. Dependency ratio on the other hand has the expected sign (positive) and statistically significant at 5 % level of significance for rural sample beneficiaries and unexpected sign (negative) for urban and the whole sample beneficiaries cases but insignificant.

The coefficient of size of loan has expected sign (positive) and insignificant in the case of rural and expected sign (positive) and significant in the case of the whole sample case while unexpected sign (negative) and significant in the case of urban. Such unexpected negative result

may indicate that the loan provided by the institution most likely becomes optimal i.e., the loan given to beneficiaries is targeted only to cover the cost of a given activity to be undertaken by a borrower.

Timeliness of loan disbursement has the expected sign (negative) in the case of rural and the whole sample cases while unexpected sign (positive) in the case of urban sample beneficiaries. However, it is statistically insignificant in the three sample cases.

The findings on the sign of the coefficients of the use of financial record for the three cases and timeliness of loan disbursement for rural and the whole sample cases are consistent with the findings reported by Mengistu (1997) and Berhanu (1999). The sign of dependency ratio for rural sample case and size of loan for rural and the whole sample cases are also consistent with Berhanu's (1999) findings. From the tables above, one may conclude that under DECSI scheme, dependency ratio and loan supervision in the case of rural; size of loan, loan supervision and other sources of income for urban and the whole sample cases are explaining factors (significant determinants) for loan diversion.

The second equation estimated in our model is the binomial probit model for full repayment performance. This is a very important equation for this study since it enables us to determine the factors that affect loan repayment performance by the beneficiaries. The factors that are expected to affect full loan repayment performance are loan diversion rate, level of education, sex, age, size of loan, loan supervision, timeliness of loan disbursement, beneficiaries attitude towards loan repayment, beneficiaries attitude towards cost of default, appropriateness of loan

repayment period, use of financial records, income from activities financed by loan, other sources of income and value of livestock (rural case). Among these variables, beneficiaries attitude towards loan repayment, beneficiaries attitude towards cost of default and appropriateness of loan repayment period are excluded from the model due to the reasons explained elsewhere above. Besides, timeliness of loan disbursement and loan supervision are excluded from the estimation in the case of urban sample beneficiaries due to the reason that their values fit the value of loan repayment performance and as a result of this the probit model is inestimable.

It has been detected that the probit model has a heteroscedasticity problem. Based on this, correction is made for heteroscedasticity and the estimates for the three cases are presented in Tables 4.24, 4.25 and 4.26. An attempt is also made to estimate the probit model for rural sample beneficiaries with livestock to compare the result without it (see Appendix 5).

**Table 4.24 Estimates of the Binomial Probit Model for Full Loan
Repayment Equation for Rural Sample Beneficiaries without Livestock
(Heteroscedasticity Corrected)**

Variable	Coefficient	Z-Value	P> Z
Constant	-7.869	-2.149	0.032
LDRH	7.789	1.308	0.191
AGE	0.181	1.266	0.206
AGESQU	-0.001	-0.878	0.380
SEX	0.960	1.840	0.066
ED	1.041	3.311	0.001
SL	-0.002	-3.864	0.000
TLD	2.036	2.642	0.008
LS	0.921	1.464	0.143
FR	-0.658	-1.202	0.229
MBI	0.010	0.023	0.982
MOI	0.016	2.642	0.008
Log likelihood	-32.348		
Restricted log likelihood	-43.062		
LR Chi2(11)	21.429		
McFadden's R ²	0.249		
Number of Observations	105		

Note: - LDRH = Predicted (fitted) value of loan diversion rate

$$McFadden\ R^2 = 1 - LnL / LnL_0$$

where LnL = Unrestricted log likelihood

$$LnL_0 = Restricted\ log\ likelihood$$

Table 4.25 Estimates of the Binomial Probit Model for Full Loan Repayment Equation for Urban Sample Beneficiaries (Heteroscedasticity Corrected)

Variable	Coefficient	Z-Value	P> Z
Constant	43.699	1.853	0.064
LDRH	-9.982	-4.353	0.000
AGE	0.266	1.306	0.191
AGESQU	-11.295	-1.196	0.232
SEX	1.221	1.957	0.050
ED	0.443	2.148	0.032
SL	-5.319	-3.257	0.001
FR	0.168	0.431	0.667
MBI	-0.279	-0.289	0.773
MOI	-1.095	-2.233	0.026
Log likelihood	-42.536		
Restricted log likelihood	-56.883		
LR Chi2(9)	28.694		
McFadden's R ²	0.252		
Number of Observations	146		

Note: - LDRH = Predicted (fitted) value of loan diversion rate

$$McFadden\ R^2 = 1 - LnL / LnL_0$$

where LnL = Unrestricted log likelihood

$$LnL_0 = Restricted\ log\ likelihood$$

Table 4.26 Estimates of the Binomial Probit Model for Full Loan
Repayment Equation for the Whole Sample Beneficiaries (Heteroscedasticity
Corrected)

Variable	Coefficient	Z-Value	P> Z
Constant	-11.867	-1.489	0.137
LDRH	-4.097	-5.261	0.000
AGE	-0.084	-1.230	0.219
AGESQU	4.416	1.318	0.188
SEX	1.431	4.833	0.000
ED	0.585	4.218	0.000
SL	-0.598	-5.321	0.000
TLD	1.679	5.183	0.000
LS	0.261	0.531	0.596
FR	0.338	1.255	0.210
MBI	0.005	2.291	0.022
MOI	0.004	1.272	0.203
Log likelihood	-50.448		
Restricted log likelihood	-63.973		
LR Chi2(11)	27.051		
McFadden's R ²	0.211		
Number of Observations	251		

Note: - LDRH = Predicted (fitted) value of loan diversion rate

$$\text{McFadden } R^2 = 1 - \text{Ln}L / \text{Ln}L_0$$

where $\text{Ln}L$ = Unrestricted log likelihood

$\text{Ln}L_0$ = Restricted log likelihood

The overall estimated models are statistically significant at 5 %, 1 % and 1 % levels of significance for rural, urban and both, respectively. According to the estimates, loan diversion is

negatively related and significant to full repayment for urban and the whole sample cases which is expected and positively related and unexpected for rural but insignificant. The observed negative sign of loan diversion indicates the use of diverted funds for non-income generating purposes. The coefficient of this variable is statistically significant at 1 % level of significance for urban and the whole sample cases.

Sex and level of education variables have the expected positive relationship with full loan repayment performance for the three cases. The coefficients of sex is statistically significant at 10 %, 10 % and 1 % for rural, urban and the whole sample cases respectively. The positive sign of sex reveals that women are more disciplined than men, at least in regard to loan repayment. Level of education is also significant at 1 %, 5 % and 1 % for rural, urban and the whole sample, respectively. The positive sign of level of education implies that normally more educated beneficiaries are expected to show a higher loan repayment performance than less educated beneficiaries. Beneficiaries age and age square are positively and negatively related respectively with full loan repayment performance for rural and urban sample cases, as expected while the opposite result has occurred for the whole sample case. However, the coefficients of both variables are statistically insignificant for the three cases.

Timeliness of loan disbursement has the expected signs (positive) and statistically significant in both rural and the whole sample cases. This implies that timely loan disbursement particularly for seasonal activities as is the case in the rural affects full loan repayment performance. Loan supervision also has positive (expected) signs for rural and the whole sample cases. However, in both cases it is statistically insignificant.

Size of loan is found to be inversely related to full loan repayment performance for the three cases as expected. The higher the loans size (especially if it is higher than the loan needed) the greater burden on beneficiaries, thus undermining loan repayment performance. The coefficient of this variable is statistically significant at 1 % level of significance for the three cases. However, as discussed elsewhere above, the coefficient of size of loan has unexpected sign and significant for urban sample case in the loan diversion model which is not consistent with our expectation. It might, thus, need further empirical investigation as far as the relationship between size of loan and loan diversion rate is concerned. Use of financial records also has positive (expected) for urban and the whole sample beneficiaries and negative (unexpected) for rural sample beneficiaries. However, the coefficient of this variable is statistically insignificant in all cases.

The coefficients of income from activities financed by the loan and other sources of income are positively related to full loan repayment performance as expected for rural and the whole sample cases and negative and unexpected for urban sample beneficiaries. The coefficient of income from activities financed by the loan is statistically significant at 5 % for the whole sample beneficiaries while insignificant for both rural and urban beneficiaries. On the other hand, the coefficient of other sources of income is statistically significant at 1 % and 5 % level of significance for both rural and urban respectively while insignificant for the whole sample beneficiaries. The observed negative sign of the coefficient of other sources of income for urban beneficiaries may be due to carelessness on the part of beneficiaries in meeting credit obligations (unwillingness to repay) since they may not need credit in the future.

The probit model with livestock for rural sample beneficiaries is also estimated (see appendix 5). According to the estimates, the overall estimated model is statistically significant at 1 % level of significance. Loan diversion rate, use of financial records and livestock have unexpected signs but statistically insignificant and all other variables have expected signs. Among those expected signs, level of education, size of loan and timeliness of loan disbursement are statistically significant at 5 % while availability of other sources of income is statistically significant at 10 %.

The findings of this study on the sign of level of education and loans size for the three cases are consistent with that reported by Mengistu (1997) while signs of sex, level of education, and loan size of this study for the three cases are found to be consistent with the study reported by Berhanu (1999). Loan diversion rate of this study for urban and the whole sample beneficiaries is also consistent with the study reported by Mengistu (1997) and Brehanu (1999). Besides, the sign of the use of financial records for the three cases, income from activities financed by the loan and other sources of income for urban sample case are consistent with the study reported by Berhanu (1999).

Comparing with Mengistu's findings, he reported a negative sign for the coefficients of sex variable. However, this study reported positive sign; which seems realistic. With respect to household income and the availability of other sources of income, Mengistu (1997) reported positive signs while this study reported positive signs for both rural and the whole sample beneficiaries but negative sign for urban sample beneficiaries. From this, we can observe that this study is consistent with Mengistu for rural and the whole sample but not consistent with urban sample beneficiaries. Therefore, positive signs of these variables seem more realistic i.e.,

under normal conditions higher income from activities financed from loan and availability of other sources of income imply better repayment capacity and thus better repayment performance.

With respect to Brehanu's (1999), this study reported similar signs on sex, level of education, and size of loan for the three cases. Besides the loan diversion rate reported by Brehanu (1999) is consistent with this study for urban and the whole sample cases.

In general, this study concludes that under DECSI scheme sex, size of loan, level of education for the three cases, loan diversion rate for urban and the whole sample cases, income from activities financed by the loan for the whole sample case, other sources of income for rural and urban sample beneficiaries, timeliness of loan disbursement for rural and the whole sample cases are significant determinants for full loan repayment performance.

CHAPTER 5 CONCLUSION AND POLICY IMPLICATIONS

5.1 Conclusion

An appropriate credit institution that responds to those who are at the lower income brackets of the society and thereby targeting credit to the poor is one of the various instruments for poverty reduction. With this basic idea, micro-financing institutions have been applied in various ways, by different bodies, the world over. Currently, provision of credit is one of the major strategies being used to alleviate poverty in Ethiopia. Accordingly, DECSI was established in Tigray Regional Government State to provide credit for rural and urban poor with priority for women who are not catered for by the existing banking institution. With reference to this, we started the study with the interest in assessing the sustainability of program viewed in terms of borrowers' viability and institutional viability. This being the case, the results discussed in the report here suggested that the institution has been directing its efforts towards poverty reduction and has scored significant success to its clients. Overall, the credit scheme has contributed positively to income for rural, urban and the whole sample cases. This is verified by the Wilcoxon Matched-Pairs non-parametric test by comparing income before and after program participation.

The increased income generated by the credit scheme had also a positive impact on access to medical facilities, access to educational facilities and household diet in all cases except access to educational facilities for urban sample beneficiaries. This is also verified by the Wilcoxon Matched-Pairs non-parametric test. According to the test result, it was found out that access to educational facility for urban sample beneficiaries has not improved perhaps because a certain

level of education may have already been reached before loan compared to that of rural as is normally expected.

The result on savings also indicated an increase in the number of beneficiaries having personal saving account after loan which suggests positive changes. However, it is not suitable to conduct non-parametric test in this case since the number of respondents having saving account before loan was very small.

Overall, it is clear from the impact study that DECSI has made a positive contribution to poverty reduction in the region. The sample respondents also confirmed this contribution by reporting that 89.5 % (rural) and 87 % (urban) have attained a better life after joining the program and they stressed this improvement in the group discussions as well.

As regards loan repayment performance, the results of the analysis discussed in the report indicate several factors that significantly influence full repayment. According to the estimates, loan diversion is negatively related and significant to full loan repayment for urban and the whole sample cases as is expected and positively related though unexpected for rural sample case and statistically insignificant. The analysis also reveals that dependency ratio and loan supervision in the case of rural, loan supervision and other sources of income for urban and size of loan, loan supervision and other sources of income for the whole sample cases are significant determinants for loan diversion

Similarly, sex and level of education have the expected positive relationship and are statistically significant with full loan repayment performance for the three cases. Beneficiaries age and age square are positively and negatively related respectively with full repayment performance for the rural and the whole sample cases, as is expected while the opposite holds true in the case of the whole sample case but they are statistically insignificant in all cases.

Timeliness of loan disbursement has the expected sign (positive) and statistically significant in both rural and the whole sample cases. Loan supervision also has positive (expected) sign for rural and the whole sample cases as regards performance of loan repayment but statistically insignificant.

The regression results also indicate that size of loan is inversely related to full loan repayment performance for the three cases as is expected and statistically significant as well. Use of financial records has positive (expected) for urban and the whole sample cases and negative (unexpected) for the rural sample case. However, it is statistically insignificant in all cases.

It is found that income from activities financed by the loan is positively related to full loan repayment performance as is expected for rural (insignificant) and the whole sample cases (significant) and negative and unexpected but insignificant for urban sample case. Similarly, other source of income is found to be positively related to full loan repayment performance which is consistent with our expectation for rural (significant) and the whole sample cases (insignificant) and negative (unexpected) and significant for urban sample case. The negative sign of the coefficient of other sources of income for urban beneficiaries may be due to

carelessness on the part of beneficiaries in meeting credit obligations (unwillingness to repay) since they may not need credit in the future from DECSI.

Generally, the study concludes that under DECSI scheme, sex, level of education, size of loan for the three cases, loan diversion rate in urban and the whole sample cases, income from activities financed by the loan for the whole sample case and other sources of income for rural and urban sample cases, timeliness of loan disbursement for rural and the whole sample cases are significant determinants for full loan repayment performance.

From the informal discussions, it was observed, particularly from the rural sample beneficiaries that the repayment period should be on a period in which the price of agricultural products are favorable since the prices of products during harvesting season are not attractive. Thus, some mechanisms should be arranged to incorporate this suggestion in to the program. Also the beneficiaries pointed out that there should be some ways of solving problems like drought, sudden death of livestock by extension of credit settlement when beneficiaries face such problems beyond their control.

In connection with the applicability of the Grameen Bank model, it is suggested that it is difficult to directly apply the model in Ethiopia since the physical and socio-economic conditions of the two countries are different. Therefore, there should be some modifications on the elements of the model namely, holding weekly meetings and repayment of installments, taking the bank to the people because it demands high administration cost due to the scattered nature of dwellers in the country, particularly the rural areas of Ethiopia. However, applicability does not necessarily

imply viability. Since there is no data on DECSI's sources of funding, operational cost and revenue, it is difficult to say something on the financial viability of DECSI as well as the replicability of the Grameen Bank model in the rest of the country because those data are the most important variables for evaluating whether or not DECSI is leaving up to expectations.

5.2 Policy Implications

According to the findings of the study summarized above, policy implications may be drawn. It is clear from this study that DECSI has made its own positive contribution on the beneficiaries in relation to income, access to educational facilities, medical facilities, household diet and savings which imply that micro-finance is becoming a tool for poverty reduction in Ethiopia. As a result of this, currently, provision of credit to the low income group is one of the major strategies being used to alleviate poverty in the country.

DECSI's emphasis on savings mobilization forces the poor to accumulate savings and increase private net worth. Savings also foster financial discipline and help borrowers smooth out consumption if they incur income losses due to production failure. Thus, saving is the most important area that needs much effort to inculcate it to the individual or group from DECSI because it is an alternative source of credit for borrowers and helps to gradually minimize the institution's dependency on outside source for funds to be extended to borrowers.

The results of this study suggest that women have better loan repayment performance than men i.e., the more women borrowers, the higher the probability of repaying loan in full. Thus,

increasing the number of women borrowers is one possible way of attaining institutional sustainability. Even as a strategy the institution gives priority to women as they are on the one hand the most vulnerable group to poverty and on the other hand more credit worthy and effective savings clients. However, as DECSI's range of operations expanded further and further into the rural areas, the proportion of women members fell. For example: it was around 50 % in 1994 and fell to around 40 % in 1999 (see Appendix 2). One factor for this reduction may be due to various historical and cultural practices that have confined female mostly to house and family management and which in turn has acted as a snag in making women unable to take advantage of such opportunities. Another factor may be the more limited range of economic opportunities available to women in the more remote rural areas than in the urban areas. Therefore, this reduction of women members in participating in the program needs further investigation.

Level of education is positively related with loan repayment performance. Thus, provision of credit to relatively educated beneficiaries may be considered as another strategy for improving loan repayment performance. However, since most of the beneficiaries particularly in the rural areas are illiterate while they are the target clienteles, considering level of education as a lending strategy may not be a fair and absolute decision. Therefore, there should be accompanying packages to make adult literacy programs particularly to the rural beneficiaries i.e., teaching the farmers on agricultural activities (use of farm inputs, improved farming methods etc.) including also use of credit, importance of loan utilization and repayment performance. This teaching program in turn will help also the beneficiaries to improve loan utilization and repayment performance.

Timely loan disbursement is one strategy for improved loan repayment performance particularly in respect of those involved in seasonal economic activities as is the case with regard to in the rural dwellers. Late loan disbursement can be avoided if late application for and approval of loans can be discouraged. Similarly, diversion of loan funds can also be reduced if the loan funds for specific activities are given at the time they are needed.

Adequate loan supervision and advice is required to achieve good loan repayment record. In this study, loan supervision has been found to be positively related with loan repayment but insignificant. However, a change in the style and quality of supervision and advice may have a significant impact on loan repayment performance. For example, aspects like checking proper use of the loan funds, offering advice on production, marketing and business management, ensuring that the previous advice and supervision are being followed and establishing good relationship between the institution and borrowers are some that can be taken into consideration. Besides, getting information from the borrowers themselves is the best way of ensuring that the type of advice they get is the most appropriate one.

Size of loan is found to be negatively related with loan repayment performance i.e., the higher the loan size the lower the probability of repaying loan in full. So, the loan amount provided to each beneficiary should be targeted approximately to cover the project cost (what is needed to undertake a particular activity by a borrower). This in turn implies that the Credit and Saving Committee which is responsible for credit screening and approval should have background in project evaluation, if they don't have any background, they should get training on it.

On top of the above, something can be said on the importance of peer monitoring. As discussed in the study above, DECSI follows a community participatory approach in which the community, the baitos (local councils) and the direct beneficiaries carry out beneficiary's selection, group formation and implementations. This approach has been a viable option for DECSI for the last five or so years because this reduces its overhead cost of membership mobilization. The group-based approach also strengthens the relationship between the members and encourages borrowers to settle their debt in time. This is so because if a member is having difficulty with repayments, others in the group will put pressure on that member to repay. This way of monitoring has great contribution in minimizing loan diversion and improving loan repayment performance. Thus, any micro-financing institution especially those engaged in the provision of loan to the poor without collateral must follow community participatory approach in the selection of clients, group and center formation and program implementation for the group serves as a guarantee, to a great extent, to ensure full loan repayment.

BIBLIOGRAPHY

- Abebe Shimeles and Bereket Kebede. 1996. Issues in the Measurement and Dynamics of Poverty: A Survey in the Ethiopian Economy: Poverty and Poverty Alleviation, Proceedings of the Fifth Annual Conference on the Ethiopian Economy, Addis Ababa.
- Adams Dale. 1988. The Conundrum of Successful Credit Projects in Floundering Rural Financial Markets in Economic Development and Cultural Change, Vol. 36, No. 198.
- Adams D.W and Von Pischke J.D. 1992. Micro-enterprise Credit Programs: Djavu, World Development Vol. 20, No. 10, pp. 1463-69
- Adeyemo Rami. 1984. Loan Delinquency in Multi – Purpose Cooperative Union in Kwara State, Nigeria, Savings and Development, Vol. 7, No. 3.
- Aryeetey Ernest. 1992. The Relationship between the Formal and Informal Sectors of the Financial Markets in Ghana, AERC, Research Paper 10.
- Atakilt Kiros. 1997. The experience of DECSI in Serving the Poor, A Paper Presented at a Workshop on Micro-Finance and Suitable Development, December 1-4, 1997, Mekelle.
- Basu Santonu. 1997. Why Institutional Credit Agencies are Reluctant to Lend to Rural Poor: A Theoretical Analysis of the Indian Rural Credit Market, World Development, Vol. 25, No. 2.
- Besley Timothy. 1994. How Do Market Failures Justify Intervention in Rural Credit Markets? The World Bank Research Observer, Vol. 9, No. 1, The World Bank, Washington D.C.
- Bekele Tilahun. 1996. The Role of Credit in the Informal Sector for Poverty Alleviation in the Ethiopian Economy: Poverty and Poverty Alleviation, Proceedings of the Fifth Annual Conference on the Ethiopian Economy, Addis Ababa.
- Berhanu Lakew. 1999. Micro-Enterprise Credit and Poverty Alleviation in Ethiopia: The Case of the Project office for the Creation of Small Scale Business Opportunities (POCSSBO) in Addis Ababa, MSc. Thesis, Department of Economics, Addis Ababa University.
- Bolnick Bruce R. 1988. Evaluating Loan Collection Performance: An Indonesian Example, World Development, Vol. 16, No. 4.
- Buckley Graeme. 1997. Micro-finance in Africa: Is it Either the Problem or the Solution? World Development, Vol. 25, No. 7.

- Central Statistical Authority (CSA). 1998. The 1994 Population and Housing Census of Ethiopia: Results for Tigray Region, Addis Ababa.
- Chekol Kidane. 1994. Can the Grameen Bank be Replicable in Tigray Region, MSc Thesis, University of Wales.
- DECSI. 1999. A short Note on DECSI , Mekelle.
- Dejene Aredo. 1993. The Informal and Semi-Informal Financial Sectors in Ethiopia: A Study of the Iqqub, Iddir, and Savings and Credit Co-operatives, AERC, Research Paper 21.
- _____. 1999. Rural Finance in a Transitional Economy: The case of Ethiopia, Proceeding of the Fourth Annual Conference on Management in Ethiopia, Addis Ababa.
- ✓ Fidler Peter and Webster Leila. 1996. The Informal Sector and Micro-finance Institutions in West Africa, World Bank Regional and Sectoral Studies, World Bank, Washington D.C.
- Fewena Meehan. 1999. Impacts of Micro-Credit at Household Level: Case Study of DECSI Credit Provision in Adigudom, Tigray, A Paper Presented to the International Conference on the Development of Micro-Finance in Ethiopia, December 2-6, Bahir Dar.
- _____. 1997. Micro-Credit as a tool for Women's Empowerment: The Case of DECSI, a Paper Presented to Micro-Finance and Sustainable Development Workshop, Tigray, Mekele.
- Goitom Ghirmatsion. 1996. Aspects of Poverty in the City of Addis Ababa: Profile and Policy Implications in the Ethiopian Economy: Poverty and Poverty Alleviation, Proceedings of the Fifth Annual Conference on the Ethiopian Economy, Addis Ababa.
- Grace Lorna. 1997. Financial Evaluation of a Leading Ethiopian Micro-Finance Institution, Relief Society of Tigray (REST), and Prepared for CGAP.
- Green William H. 1993. Econometric Analysis, 2nd ed., Prentice Hall, Englewood Cliffs.
- Gurgant Marc, Pederson Glenn and Yaron Jacob. 1996. Outreach and Sustainability of Six Rural Finance Institutions in Sub-Saharan Africa, World Bank Discussion Papers No. 248, The World Bank, Washington D.C..
- Hoff k and Stiglitz J.E. 1993. "Imperfect Information and Rural Credit Market-Puzzles and Policy Perspectives", The Economics of Rural Organization, Theory, Practice, and Policy, Published for the World Bank, Oxford University Press.
- Hossain Mahabub. 1988. Credit for Alleviation of Rural Poverty: The Grameen Bank in Bangladesh, International Food Policy Research Institute, Research Report 65.

- Hunte, C. Kenrick. 1996. Controlling Loan Default and Improving the Lending Technology in Credit Institutions, Savings and Development, Vol. 20, No.1.
- Huppi M. and Feder. 1990. The role of Groups and Credit Cooperatives in Rural Lending, World Bank Research Observer, Vol. 5, No. 2, pp. 187-204.
- Hyuha M, Ndanshau O, and Kipokola J. 1993. Scope, Structure and Policy Implications of Informal Financial Markets in Tanzania, AERC, Research Paper1 18.
- Jaffe D Weight and Stiglitz Joseph. 1990. Credit Rationing, Hand Book of Monetary Economics, Vol. 2.
- Johnson Susan. 1998. Program Impact Assessment in Micro-Finance: The Need for Analysis of Real Markets, IDS Bulletin Vol. 29, No. 4.
- ✓ Johnson Susan and Rogaly Ben. 1997. Micro-Finance and Poverty Reduction, Oxfam (UK and Ireland).
- Kashuliza A. 1993. Loan Repayment and its Determinants in Smallholder Agriculture: A Case Study in the Southern Highlands of Tanzania, East Africa Economic Review, Vol. 9, No. 1.
- ✓ Khandker Shahidur R. 1998. Micro-Credit Program Evaluation: A Critical Review, IDS Bulletin Vol. 29 No. 4.
- Khandker Shahidur R and Baqui Khaily. 1996. The Bangladesh Rural Advancement Committee's Credit Programs, Performance and Sustainability, World Bank Discussion Papers No. 324, The World Bank, Washington D.C.
- ✓ Khandker Shahidur R., Baqui Khaily, and Zahed Khan. 1995. Grameen Bank Performance and Sustainability, World Bank Discussion Papers No. 306, The World Bank, Washington D.C.
- Kulundu Manda D. 1990. Smallholder Credit Repayment in Kenya: A Case Study of Lugari Division in Kakamega District, MSc. Thesis, Department of Economics, University of Nairobi.
- Maddala G.S. 1988. Introduction to Econometrics, Macmillan Publishing Company, New York.
- _____. 1983. Limited Dependent and Qualitative Variables in Econometrics, Cambridge University Press.
- Mekonnen Tadesse. 1996. Food Consumption and Poverty in Urban Ethiopia: A Preliminary Assessment in the Ethiopian Economy: Poverty and Poverty Alleviation, Proceedings of the Fifth Annual Conference on the Ethiopian Economy, Addis Ababa.

- Mengistu Bediye. 1997. Determinants of Micro-enterprises Loan Repayment and Efficacy of Screening Mechanism in Urban Ethiopia: The Case of Bahir Dar and Awasa Towns, MSc. Thesis, Department of Economics, Addis Ababa University.
- Ministry of Foreign Affairs. 1997. Ethiopia: Country Profile, Addis Ababa.
- Micro-Finance Development Review. 2000. Vol.1, No. 1, Addis Ababa
- Ministry of Economic Development and Cooperation (MEDaC). 1999. Survey of the Ethiopian Economy: View of Post-Reform /Development (1992/93-1997/98), Addis Ababa.
- Muluwork, Kidanemariam. 1997. Impact Assessment of Rural Credit on the Lives of Clients: A Paper Presented for Micro-Finance and Sustainable Development Workshop, Tigray, Mekele.
- National Bank of Ethiopia. 1996. Study on the Need for Establishing Rural and Urban Micro-Finance Institutions in Ethiopia, Addis Ababa
- Negarit Gazeta. 1996. A proclamation to Provide for the Licensing and Supervision of the Business of Micro-Financing Institutions, Proclamation No. 40.
- Osmani Lutfun. 1998. Impact of Credit on the Relative Wellbeing of Women: Evidence from the Grameen Bank, IDS Bulletin Vol. 29, No.
- Pitt, Mark M, and Khandker Shahidur R. 1996. Household and Intra-Household Impact of the Grameen Bank and Similar Targeted Credit Programs in Bangladesh, World Discussion Papers, No. 320, The World Bank, D.C.
- Seifu Belay. 1998. People's Participation in Micro-Enterprise Project, A Paper Presented to the National Micro-Enterprise Project Workshop, (Amharic Version), June 9-11, Addis Ababa.
- ✓ Sinha Saurabh. 1998. Micro-Credit: Impact, Targeting and Sustainability: Introduction and Overview, IDS Bulletin Vol. 29, No. 4.
- Solomon Damte. 1996. Credit to Poor Households: the Case of Financing Micro-Enterprises in the Debre Berhan Town, North Shoa, Ethiopia in the Ethiopian Economy: Poverty and Poverty Alleviation, Proceedings of the Fifth Annual Conference on the Ethiopian Economy, Addis Ababa.
- Stiglitz J.E. 1993. "Peer Monitoring and Credit Markets", The Economics of Rural Organization, Theory, Practice, and Policy, Published for the World Bank, Oxford University Press.
- Tesfaye Assefa. 1993. Rural Credit in Ethiopia, Addis Ababa.

- Thillairajah Sabapathy. 1994. Development of Rural Financial Markets in Sub-Saharan Africa, World Bank Discussion Papers, No. 219, World Bank, Washington D.C.
- Thomas R.L. 1997. Modern Econometrics: An Introduction, Department of Economics, Manchester Metropolitan University, Harlow, England.
- Trufat Bekele. 1996. Poverty in Ethiopia (1994/1995), MSc. Thesis, Department of Economics, Addis Ababa University.
- Van Matre. 1996. Statistics for Business and Economics, Business Publications Inc., USA.
- Vigano, Laura. 1993. A Credit Scoring Model for Development Banks: An African Case Study, Savings and Development, Vol. XVII, No. 4.
- Von Pischke J.D. 1991. Finance at the Frontier: Debt Capacity and the Role of Credit in the Private Economy, Economic Development Institute of The World Bank, Washington D.C.
- Wolday Amha. 1999. Networking Micro-Finance Activities in Ethiopia: Challenges and Prospects, A Paper Presented at the International Conference on the Development of Micro-finance in Ethiopia, December 2-5, Bahir Dar.
- Yaqub Shahin. 1995. Empowered to Default? Evidence from BRAC's Micro-Credit Programs, Small Enterprise Development, Vol. 6, No. 4, pp. 4-13.
- ✓ Yaron Jacob. 1992. Successful Rural Financial Institutions, World Bank Discussion Papers No. 150, The World Bank, Washington D.C.
- _____. 1994. What Makes Rural Finance Institutions Successful? The World Bank Research Observer, No. 9, No. 1.
- Yohannes G/Meskel. 1997. Participatory Methodology in Micro-Financial Institutions: A Paper Presented for a Workshop on Micro-Finance and Sustainable Development, Tigray, Mekele.
- Yohannes Kinfu. 1996. Demographic Characteristics of Poor Households in Urban Ethiopia: The Case of Dire Dawa Town in the Ethiopian Economy: Poverty and Poverty Alleviation, Proceedings of the Fifth Annual Conference on the Ethiopian Economy, Addis Ababa.
- Zaid Negash. 1999. Impact of DECSI's Credit in Tigray: A Paper Presented to the International Conference on the Development of Micro-finance in Ethiopia, December 2-6, Bahir Dar.

Appendix 1 Expansion of DECSI's Branches, Sub-branches and Centers (1994-1999)

Year	Number of branches	Number of sub-branches	*Number of centers
1994	-	14	152
1995	-	20	279
1996	11	57	331
1997	12	103	1528
1998	12	109	3538
1999	12	109	4633

Source: -DECSI (1999)

**Center includes on average from 7-10 groups*

Appendix 2 Regular Borrowers and Groups under DECSI Credit Scheme (1994-1999)

Years	*Number of Groups			Number of Borrowers		
	Male	Female	Total	Male	Female	Total
1994	625	615	1240	4264	4182	8446
1995	1243	971	2214	7703	6178	13881
1996	1588	1192	2780	11175	9340	20515
1997	7533	4687	12220	41431	25626	67057
1998	18771	11513	30284	105985	62991	168976
1999	23949	16797	40746	146540	103761	250301

Source: - DECSI (1999)

**Group refers to 5 to 7 borrowers together.*

Appendix 3 Amount of Loan Disbursed by DECSI (in Birr)

Particulars	Years				
	1994	1995	1996	1997	1998
Regular Borrowers					
Male	5192810	7305812	14624797	42260747	86011420
Female	3749704	4271446	5970762	21061638	46724637
Total	8942514	11577258	20595559	63322385	132736057
Agricultural input borrowers					
Male					
Female					
Total	-	2282215	6614482	24514306	27652429
All borrowers					
Male	5192810	7305812	14624797	42260747	86011420
Female	3749704	4271446	5970762	21061638	46724637
Total	8942514	13859473	27210041	87836691	160388486

Source: -DECSI (1999)

Appendix 4 Amount of Savings Mobilized by DECSI (in Birr)

No.	Particulars	Years				
1	Loan from clients' saving	1994	1995	1996	1997	1998
1.1	Group saving					
	Male	245562	577047	1075095	3276586	8403117
	Female	213452	472129	879623	1883286	4434893
	Total	459013	1049176	1954718	5159843	12838010
1.2	Center saving					
	Male	22845	85397	137555	408750	1246093
	Female	34550	78828	168122	355384	843709
	Total	57395	164225	305677	764134	2059802
1.3	Personal saving					
	Male	13317	79291	499057	2006751	4254117
	Female	44073	96912	332705	1088153	2351013
	Total	57390	176203	831762	3094904	6605130
2	Non-loan clients					
	Male	-	-	-	9635002	7119056
	Female	-	-	-	2085824	2569952
	Total	-	-	-	11720826	9689008
3	Institution	-	-	-	9375502	12604584
4	Grand Total					
	Male	281723	741735	1711707	24702590	33596967
	Female	292075	647869	1380450	5412648	10199567
	Total	573798	1389604	3092157	30115238	43796534

Source: - DECSI, as of September 1998

**Appendix 5 Estimates of the Binomial Probit Model for full Loan
Repayment Equation for Rural Sample Beneficiaries with Livestock
(Heteroscedasticity Corrected)**

Variable	Coefficient	Z-Value	P> Z
Constant	-4.254	-0.679	0.497
LDRH	7.986	1.160	0.246
AGE	0.052	0.199	0.842
AGESQU	-0.0001	-0.039	0.969
SEX	0.902	1.364	0.173
ED	1.019	2.358	0.018
SL	-0.002	-2.330	0.020
TLD	2.126	2.557	0.011
LS	0.620	0.687	0.492
FR	-0.241	-0.269	0.788
MBI	0.182	0.488	0.625
MOI	0.015	1.812	0.070
LSTOCK	-0.0004	-1.464	0.143
Log likelihood	-25.776		
Restricted log likelihood	-43.062		
LR Chi2(12)	34.572		
McFadden's R ²	0.401		
Number of Observations	105		

Note: - LDRH = Predicted (fitted) value of loan diversion rate
 $McFadden R^2 = 1 - LnL / LnL_0$
where LnL = Unrestricted log likelihood
 $LnL_0 =$ *Restricted log likelihood*

Appendix 6 QUESTIONNAIRE FOR THE SURVEY ON "MICRO-FINANCE AND THE POOR: THE CASE OF DEDEBIT CREDIT AND SAVINGINSTITUTION (DECSI) IN TIGRAY"

ZONE: _____ WOREDA: _____ TOWN _____
 KEBELE: _____ HOUSE NO. _____ QUESTIONNAIRE NO. _____
 ENUMERATOR: _____ DATE: _____
 =====

SECTION I - PERSONAL DETAIL

- 1.1 Name of Borrower: _____
 1.2 Borrower's Age: _____
 1.3 Borrower's Sex: _____ 1) Female _____ 2) Male _____
 1.4 Marital Status:
 1) Single _____ 2) Married _____
 3) Divorced _____ 4) Widowed _____
 1.5 Level of Education:
 1) None _____ 2) Read and Write _____
 3) Grade 1 – 6 _____ 4) Grade 7 - 8 _____
 5) Grade 9 - 12 _____ 6) Above Grade 12 _____
 1.6 Household Size: _____ 1) Female _____ 2) Male _____
 1.7 Number of Dependents: 1) Female _____ 2) Male _____
 1.8 Do you live in the same household with your family?
 1) Yes _____ 2) No _____
 1.9 If yes, who is the head of the household? _____
 1.10 If no, on average how much do you remit per month for their upkeep? Birr _____

SECTION II - GROUP FORMATION INFORMATION

- 2.1 Name of the group (if any) to which the borrower belongs: _____
 2.2 How many members does the group have? _____
 2.3 Did you know all members of your group before joining it?
 1) Yes _____ 2) No _____
 2.4 Do you feel any obligation to the other members of your group?
 1) Yes _____ 2) No _____
 2.5 Did you have the feeling that you might be sued in case of failure to repay the loan?
 1) Yes _____ 2) No _____
 2.6 Do you monitor whether a member of your group uses the loan for the intended purpose?
 1) Yes _____ 2) No _____
 2.7 If yes, what actions do you take in case of diversion? _____

SECTION III - LOAN AND LOAN REPAYMENT

a) BEFORE PROGRAM PARTCIATION

- 3.1 Have you ever obtained loans from other sources before you joined the program?
 1) Yes _____ 2) No _____

3.2 If yes, when? and what was the main source?

-Year _____

-Source of Loan

- | | |
|-----------------------------------|--------------------------|
| 1) Bank loan _____ | 2) Iddir _____ |
| 3) Friends/Relatives _____ | 4) Moneylenders _____ |
| 5) Saving and Credit Groups _____ | 6) Other (specify) _____ |

3.3 If you have not taken any loan, what is the main reason

- | | |
|---|-----------------------------|
| 1) Collateral Problem _____ | 2) High interest rate _____ |
| 3) Amount of loan offered inadequate for planned investment _____ | |
| 4) Other, specify _____ | |

3.4 If borrowed, purpose of loan:

- | |
|--|
| 1) To buy food during acute food shortage _____ |
| 2) To cove medical expense of the family _____ |
| 3) To purchase inputs _____ |
| 4) To establish income generating enterprise _____ |
| 5) To repay previous debt _____ |
| 6) Other (specify) _____ |

3.5 If borrowed, in how many months was the total loan to be fully repaid? _____

3.6 Have you completed repayment? 1) Yes _____ 2) No _____

3.7 If no, specify the main reasons for doing so and the outstanding balance?

- Reason: _____
- Amount outstanding: Birr _____

b) AFTER PROGRAM PARTCIATION

3.8 Please provide the following details on the loan borrowed from DECSI.

	Amount (Birr)	Date Applied (mm/yy)	Date Received (mm/yy)	Term Of Loan
Loan 1	_____	_____	_____	_____
Loan 2	_____	_____	_____	_____
Loan 3	_____	_____	_____	_____
Loan 4	_____	_____	_____	_____

3.9 Main intended purpose

Item	Amount (Birr)
1) _____	_____
2) _____	_____
3) _____	_____

3.10 Actual use of loan

a) On purpose specified in the loan agreement

Item	Amount (Birr)
1) _____	_____
2) _____	_____
3) _____	_____

b) On non-intended purpose

Item	Amount (Birr)
1) _____	_____
2) _____	_____
3) _____	_____

3.11 If you spent all or part of the loan on non-intended purposes, specify your reasons _____

3.12 Was the loan sufficient to cover project costs?

1) Yes _____ 2) No _____

3.13 What was the repayment period per installment?

1) Monthly _____ 2) Biannually _____
3) Annually _____ 4) Other (specify) _____

3.14 What was the amount of each loan repayment installment? Birr _____

3.15 Was the repayment period appropriate from your point of view?

1) Yes _____ 2) No _____

3.16 If no, specify the reason and recommend an appropriate repayment period.

- Reason _____
- Recommended appropriate period _____

3.17 Status of recent loan

1) Fully repaid _____
2) Repayment on schedule _____
3) Repayment in arrears _____

3.18 If repayments are on schedule, what is the outstanding balance you are required to pay? Birr _____

3.19 If repayments are in arrears,

a) What is the balance? Birr _____

b) What is the major cause of the problem?

1) Loan based business activity was not profitable _____
2) Used some of the loan for household living expense _____
3) Sold on credit but did not get paid back on time _____
4) Loss of assets acquired by the loan _____
5) Other (specify) _____

3.20 Do you believe that loan should be repaid?

1) Yes _____ 2) No _____

3.21 Do you believe that the cost of default is high?

1) Yes _____ 2) No _____

3.22 If the cost of default is high, to which cost of default do you give emphasis?

1) The claims against personal wealth _____
2) The claims against guarantees _____
3) Social sanctions such as lose of social status _____

- 4) Lose of future access to credit and other economic benefits _____
 5) Other (specify) _____
- 3.23 What do you think about the timeliness of loan issue?
 1) Loan issue was timely _____
 2) Loan issue was not timely _____
- 3.24 If not timely, what was the impact of the delay? _____

SECTION IV - MARKET SITUATION AND CREDIT BENEFIT

- 4.1 Please list the major products and/or services produced from your business that is financed by the loan from DECSI?
 1) _____ 2) _____
 3) _____ 4) _____
- 4.2 How was the demand for your product?
 1) High _____ 2) Average _____
 3) Low _____
- 4.3 What was the price for your product?
 1) It was favorable _____
 2) It was unfavorable _____
- 4.4 What was the trend of profits in the level of your business elsewhere in the past two or so years?
 1) Increased _____ 2) Stayed the same _____
 3) Decreased _____
- 4.5 If increased, is it because of
 1) Sufficient fund _____ 2) Availability of market _____
 3) Quality advantage _____ 4) favorable price _____
 5) Other (specify) _____
- 4.6 If decreased, is it because of
 1) Insufficient fund _____ 2) Lack of market _____
 4) Quality disadvantage/quality of a second rate compared with that of competitors _____
 5) Unfavorable price _____ 5) Other (specify) _____

SECTION V - SUPERVISION AND ADVISING

- 5.1 Have you had any training or consultancies from DECSI for your business? activities?
 1) Yes _____ 2) No _____
- 5.2 If yes, what type of training/advice did you receive?
 1) Management _____ 2) Marketing _____
 3) Bookkeeping _____ 4) Production _____
 5) Other (specify) _____

- 5.3 Was there any supervision on loan utilization?
- From DECSI staff 1) Yes _____ 2) No _____
 - From Kebele/Peasant Administration 1) Yes _____ 2) No _____
- 5.4 Was there any supervision on loan repayment?
- From DECSI staff 1) Yes _____ 2) No _____
 - From Kebele/Peasant Administration 1) Yes _____ 2) No _____
- 5.5 What is your personal opinion on the supervision in general?
- 1) It was satisfactory _____ 3) No opinion _____
 - 2) It was not satisfactory _____
- 5.6 If not satisfactory, do you believe that it has contribution for loan default?
- 1) Yes _____ 2) No _____
- 5.7 What is your personal opinion on the advantage of the supervision?
- a) From DECSI staff 1) Positive _____ 2) Negative _____ 3) No opinion _____
 - b) From Kebele/Peasant Administration
 - 1) Positive _____ 2) Negative _____ 3) No opinion _____

SECTION VI - INCOME AND WEALTH INFORMATION

- 6.1 Did you have a source of income for your household before the loan?
- 1) Yes _____ 2) No _____
- 6.2 If yes, specify the source and level of income?
- Source(s) of income: _____
 - Average monthly income: Birr _____
- 6.3 How much average monthly income do you get from your business financed by the loan from DECSI?
- 1) Below Birr100 _____ 2) Between Birr 101-200 _____
 - 3) Between Birr 201-300 _____ 4) Between Birr 301-400 _____
 - 5) Between Birr 401-500 _____ 6) Above Birr 500 _____
- 6.4 What is the average monthly income for your household from other sources after taking loan from DECSI and establishing business?
- | Source | Average Monthly Income (Birr) |
|----------|-------------------------------|
| 1) _____ | _____ |
| 2) _____ | _____ |
| 3) _____ | _____ |
| 4) _____ | _____ |
- 6.5 What is the value of assets (including assets for purposes other than your business) you purchased after program participation?
- 1) Below Birr1000 _____ 2) Between Birr 1001-2000 _____
 - 3) Between Birr 2001-3000 _____ 4) Between Birr 3001-4000 _____
 - 5) Between Birr 4001-5000 _____ 6) Above Birr 5000 _____
- 6.6 Have you made any improvements or repairs to your house after the loan?
- 1) Yes _____ 2) No _____

- 6.7 Did/Do you have a radio/cassette player?
 - Before loan 1) Yes _____ 2) No _____
 - After loan 1) Yes _____ 2) No _____
- 6.8 Did/Do you have a TV set?
 - Before loan 1) Yes _____ 2) No _____
 - After loan 1) Yes _____ 2) No _____
- 6.9 Did you have livestock before loan?
 1) Yes _____ 2) No _____
- 6.10 If yes, list their type and number
- | Type | No. | Type | No. |
|----------|-------|--------------------|-------|
| 1) Ox | _____ | 5) Donkey | _____ |
| 2) Cows | _____ | 6) Camel | _____ |
| 3) Goats | _____ | 7) Other (specify) | _____ |
| 4) Sheep | _____ | | |
- 6.11 Do you have livestock after loan?
 1) Yes _____ 2) No _____
- 6.12 If yes, list their type and number
- | Type | No. | Type | No. |
|----------|-------|--------------------|-------|
| 1) Ox | _____ | 5) Donkey | _____ |
| 2) Cows | _____ | 6) Camel | _____ |
| 3) Goats | _____ | 7) Other (specify) | _____ |
| 4) Sheep | _____ | | |
- 6.13 Did/Do you have your own land?
 - Before loan 1) Yes _____ 2) No _____
 - After loan 1) Yes _____ 2) No _____
- 6.14 If yes, owns land of any help in your loan repayment?
 1) Yes _____ 2) No _____
- 6.15 If 6.14 is yes, is it because of
 1) Goodwill of the site of the land _____
 2) Area(Size) of land _____
 3) Other (specify) _____
- 6.16 Has your total household income changed after the loan?
 1) Increased _____ 2) Stayed the same _____
 3) Decreased _____

SECTION VII - LIVING STANDARD AND CONDITIONS

7.1 CONSUMPTION

- 7.1.1 What was the average monthly consumption expenditure of your household?
 before loan?
- | | |
|-------------------------------|-------------------------------|
| 1) Below Birr100 _____ | 2) Between Birr 101-200 _____ |
| 3) Between Birr 201-300 _____ | 4) Between Birr 301-400 _____ |
| 5) Between Birr 401-500 _____ | 6) Above Birr 500 _____ |

- 7.1.2 Who was the bearer of the consumption expenditure in your household?
 1) Yourself _____ 2) Other family members _____
 3) Yourself and other family members _____ 4) Donors _____
 5) Yourself and donors _____ 6) Yourself, other family members and donors _____
 7) Other (specify) _____
- 7.1.3 What is the average monthly consumption expenditure of your household after loan?
 1) Below Birr100 _____ 2) Between Birr 101-200 _____
 3) Between Birr 201-300 _____ 4) Between Birr 301-400 _____
 5) Between Birr 401-500 _____ 6) Above Birr 500 _____
- 7.1.4 Who is the bearer of consumption expenditure in your household after loan?
 1) Yourself _____ 2) Other family members _____
 3) Yourself and other family members _____ 4) Donors _____
 5) Yourself and donors _____ 6) Yourself, other family members and donors _____
 7) Other (specify) _____
- 7.1.5 Has the household diet improved or worsened? (i.e., after loan)
 1) Improved _____ 2) Stayed the same _____
 2) Worsened _____
- 7.1.6 If improved, do you think that the nutritional status of your family has improved after loan?
 1) Yes _____ 2) No _____

7.2 EDUCATIONAL FACILITIES

- 7.2.1 If you have children and other school-age family dependants, how many of them have access to school?
 - Before the loan: _____
 - After the loan: _____
- 7.2.2 Average educational expenditure per year:
 - Before the loan: _____
 - After the loan: _____
- 7.2.3 Do you think that your and your family access to educational facilities has improved following the loan?
 1) Yes _____ 2) No _____
- 7.2.4 If no, please indicate the main reasons
 1) Lack of educational facilities _____
 2) High price educational facilities _____
 3) Low level of income _____
 4) Distant of educational facilities _____
 5) Other (specify) _____

7.3 MEDICAL FACILITIES

- 7.3.1 Did your family and yourself have access to medical facilities before loan
 1) Yes _____ 2) No _____

7.3.2 If yes, who was the bearer of the medical expenditure?

- 1) Yourself _____ 2) Relatives/Friends _____
3) Other family members _____ 4) Free user _____

7.3.3 Do your family and yourself have access to medical facilities after loan?

- 1) Yes _____ 2) No _____

7.3.4 If yes, who is the bearer of medical expenditure?

- 1) Yourself _____ 2) Relatives/Friends _____
3) Other family members _____ 4) Free user _____

7.3.5 Average household medical expenditure per year:

- Before loan: Birr _____

- After loan: Birr _____

7.3.6 Has your access to medical facilities improved after loan?

- 1) Yes _____ 2) No _____

7.3.7 If no, what is the main reason?

- 1) Lack of medical facilities _____
2) High price medical facilities _____
3) Low level of income _____
4) Distant of institutions that provides medical facilities _____
5) Other (specify) _____

7.4 OTHER FACILITIES

7.4.1 Did/Do you have your own toilet facility?

- Before loan 1) Yes _____ 2) No _____

- After loan 1) Yes _____ 2) No _____

7.4.2 Did/Do you have your own water facility?

- Before loan 1) Yes _____ 2) No _____

- After loan 1) Yes _____ 2) No _____

7.4.3 Did/Do you have your own electricity line?

- Before loan 1) Yes _____ 2) No _____

- After loan 1) Yes _____ 2) No _____

SECTION VIII - EMPLOYMENT AND PRODUCTION

8.1 What was the major type of activity you were engaged in before loan?

- 1) Local drink preparation _____ 2) Wood/Metal works _____
3) Textile/Garment Making/Tailoring _____ 4) Shoe Repair _____
5) Hotel/Restaurant Operation _____ 6) Barber _____
7) Retail trade _____ 8) Tannery Processing _____
9) Food Production _____ 10) Other (specify) _____

8.2 Other than yourself, how many workers helped you with work before loan?

- 1) Family member(s) _____ 2) Apprentice _____
3) Hired labor _____

8.3 What is the major type of activity you are engaged in after loan?

- 1) Local drink preparation _____ 2) Wood/Metal works _____

- 3) Textile/Garment Making/Tailoring _____ 4) Shoe Repair _____
 5) Hotel/Restaurant Operation _____ 6) Barber _____
 7) Retail trade _____ 8) Tannery Processing _____
 9) Food Production _____ 10) Other (specify) _____
- 8.4 Other than yourself, how many workers helped you with work after loan?
 1) Family member(s) _____ 2) Apprentice _____
 3) Hired labor _____
- 8.5 Do/Did you use purchased inputs for your business?
 - Before loan 1) Yes _____ 2) No _____
 - After loan 1) Yes _____ 2) No _____
- 8.6 Do you think that your overall inputs use has improved following the loan?
 1) Yes _____ 2) No _____
- 8.7 If yes, explain why. _____
- 8.8 If no, explain why. _____

SECTION IX - SAVING AND FINANCIAL RECORDS

- 9.1 Did you have a personal saving account before loan (alone or jointly with spouse)?
 1) Yes _____ 2) No _____
- 9.2 If yes, specify the average monthly saving amount: Birr _____
- 9.3 Do you have a personal saving account after loan (alone or jointly with spouse)?
 1) Yes _____ 2) No _____
- 9.4 If yes, specify the average monthly saving amount: Birr _____
- 9.5 What for do you mainly use your saving (other than collateral)?
 1) Household living expenses _____ 2) Household assets _____
 3) Business working capital _____ 4) Other (specify) _____
- 9.6 Do you operate a separate bank account for your business?
 1) Yes _____ 2) No _____
- 9.7 Do you keep financial records for your business?
 1) Yes _____ 2) No _____
- 9.8 If yes, are your financial records of any help in your loan repayment?
 1) Yes _____ 2) No _____

SECTION IX - OTHER INFORMATION

- 10.1 Have you noticed any change in behavior towards you from spouse from the time you started participating in the program?
 1) Yes _____ 2) No _____
- 10.2 Was/is there less or more quarrel and confrontation with spouse?
 - Before loan 1) Less _____ 2) More _____
 - After loan 1) Less _____ 2) More _____

- 10.3 Were you a committee member of any community group or organization before?
 1) Yes _____ 2) No _____
- 10.4 If yes, what was the type of community organization?
 1) Kebele/Peasant Administrations _____ 2) Self-help group _____
 3) School committee _____ 4) Development committee _____
 5) Community Health _____ 6) Other (specify) _____
- 10.5 Are you a committee member of any community group or organization after program participation?
 1) Yes _____ 2) No _____
- 10.6 If yes, what is the type of community organization?
 1) Kebele/Peasant Administrations _____ 2) Self-help group _____
 3) School committee _____ 4) Development committee _____
 5) Community Health _____ 6) Other (specify) _____
- 10.7 What was the trend of interest rate of moneylenders in your town for the past?
- | Years | Rate |
|-------|-------|
| 1996 | _____ |
| 1997 | _____ |
| 1998 | _____ |
| 1999 | _____ |
- 10.8 Have you made less use of moneylenders since 1996?
 1) Yes _____ 2) No _____
- 10.9 If yes, why?
 1) Intervention of DECSI _____ 2) High interest rate _____
 3) Religious reasons _____ 4) Other (specify) _____
- 10.10 Overall, has your life been better after loan than before loan?
 1) Yes _____ 2) No _____
- 10.11 If no, why not? _____

- 10.12 What are the major constraints (if any) to the performance of your business?
 1) Lack of markets _____ 2) Lack of capital _____
 3) Lack of inputs from suppliers _____ 4) Inadequate skill _____
 5) Lack of suitable premises _____ 6) Other (specify) _____
- 10.13 What is your overall opinion about the program? _____

- 10.14 Can you suggest any means of improving the program? _____

- 10.15 Enumerator's comments and/or observations _____

DECLARATION

The thesis is my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.

Declared by:

Teferi Zewdu

Candidate

June, 2000

Confirmed by:

Dr. Dejene Aredo

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June, 2000