



**ST. MARY'S UNIVERSITY  
SCHOOL OF GRADUATE STUDIES**

**FACTORS AFFECTING LOAN REPAYMENT PERFORMANCE OF  
FLORICULTURE GROWERS: THE CASE OF DEVELOPMENT  
BANK OF ETHIOPIA**

**BY**

**MULUKEN TARIKU**

**JUNE, 2014  
ADDIS ABABA, ETHIOPIA**

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**ST. MARY'S UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
INSTITUTE OF AGRICULTURE AND DEVELOPMENT STUDIES**

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## DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Bekabil Fufa (PhD). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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**June, 2014**

## ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

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Advisor

**St. Mary's University, Addis Ababa**

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Signature

**June, 2014**

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## **ABBREVIATIONS**

ACP	Agricultural Commodities Program
ADLI	Agricultural Development Led Industrialization
AIDB	Agricultural and Industrial Development Bank
CC	Contingency Coefficient
DBE	Development Bank of Ethiopia
EHDA	Ethiopian Horticulture Development Agency
EHPEA	Ethiopian Horticulture Producer and Exporters Association
HSB	Housing and Saving Bank
KYC	Know Your Customer
MDGs	Millennium Development Goals
MoFED	Ministry of Finance and Economic Development
NBE	National Bank of Ethiopia
NGOs	Non-Governmental Organizations
NPLs	Non Performing Loans
PSI	Private Sector Investment Program
PSSA	Pension and Social Security Authority
TGE	Transitional Government of Ethiopia
VC	Video Conference
VIF	Variance Inflation Factor

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## **ABSTRACT**

*This study carried out an assessment on factors that influence loan repayment performance of DBE's floriculture credit borrowers and estimated the relative importance of factors in improving loan repayment performance among floriculture credit borrowers. The study used secondary Data collected from the individual files of fifty four floriculture credit borrowers of DBE. The study shows that 28 (52%) of the floriculture credit borrowers were defaulters, whereas the rest 26 (48%) were non defaulters. Probit model was used to identify variables which determine loan repayment performance. Follow-ups made by the bank, education status, sustainable floriculture certification status and farming experience of floriculture credit borrowers were statistically significant factors affecting repayment of floriculture loan of DBE. The analysis of partial marginal effect shows that sustainable floriculture certification is the most important factor among the other three variables. The policy implications of the study are: educating all floriculture growers on the importance of being certified with a multitude of standards in the form of certification schemes, codes of practice and a handful of consumer labels so that they can adopt those standards which best meet customer needs, intensifying supervision work in order to provide information and technical assistance for the established project, and improving customer recruitment system to emphasize on education status of borrowers and farming experience of project managers deserve special attention. Finally, credit institutions or lending agencies should look out for the factors that significantly influence loan repayment before granting loans to floriculture growers to reduce loan defaults.*

**Key Words:** *Floriculture growers, Loan repayment, Probit model*

# **CHAPTER ONE: INTRODUCTION**

## **1.1. Background of the Study**

Floriculture is one of the fastest growing export industries in Ethiopia. Today, the cut-flower trade is conceived to be an important means of diversifying the export regime, an additional source of export earnings and an employment generation opportunity in Ethiopia.

Even though the revival of the horticulture export development sector in Ethiopia started only about a decade ago, the industry has scored significant positive developments. Currently, more than 120 foreign and local companies are engaged in the cultivation of horticultural export products. The majority of the companies operating in the sector are owned by foreign investors in the form of sole proprietorship or partnerships. Out of the total number of horticulture producers and exporters, about 80% are engaged in the floriculture business, whereas the remaining 20% are involved in the development of vegetables and fruit (EHDA, 2012).

Ethiopia is now the second largest flower exporter in Africa ranking only second to Kenya and fifth in the world after Holland, Colombia, Kenya and Ecuador. With a good mix of incentives and active facilitation, the Government of Ethiopia took a non-existing flower sector and developed it into a USD \$212 million export sector with more than 50,000 labors employed. This was possible because Ethiopia enjoys an inherent comparative and competitive advantage in the production and delivery of flowers. While Ethiopia's agro-climatic and altitude variety give it vast advantages in growing a wide variety of flowers, its location affords it fast and cheaper transport and delivery potential. Those flowers are produced in modern farms around Addis Ababa and in the Rift Valley and are exported via Bole International Airport in Addis Ababa (Ibid, 2012).

To enhance the production and export of floriculture the government of Ethiopia has been providing different facilities & efficient services by different institutions for the investors. Development Bank of Ethiopia is one of the institutions which enable the government development policies to be realizable. DBE has been engaged in providing financial

support for development projects within the country more than a century. Since floriculture is one of the commercial scale agricultural sub-sector and government's priority area; DBE has been providing finance almost for half of floriculture farms which are operating in the country (DBE, 2013).

However, among DBE financed floriculture farms a number of them delayed the loan repayment schedule. This has an impact on the sustainable provision of credit to the potential investors and existence of the bank as a financial institution. It is therefore, important for the financial institutions to devise means to reduce the levels of loan default. This can be achieved if they know the factors that influence loan repayment behaviour of floriculture growers. Thus; the study investigates the factors affecting loan repayment performance of floriculture growers.

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

Many financial institutions in developing countries provide financial services such as saving and credit to aid several enterprises including farmers. This is an effort in line with the Millennium Development Goals (MDGs) which seek to reduce poverty by 50% by the year 2015. However, the sustainability and continuity of the financial institutions to increase the volume of credit to stimulate the poverty reduction goal depends on the repayment rates. High repayment rates allow the institutions to lower the interest rates and processing costs and consequently increase patronage of loans. Repayment performance thus serves as a positive signal for increasing the volume of credit availability to various sectors of the economy (Acquah and Addo, 2011). However, the financial institutions continue to decline credit to the agricultural sectors. This decline is partly due to poor loan repayment performance from these sectors. Most of the loans default in these sectors could arise from poor management procedures, loans diversion and unwillingness to repay loans as well as other socioeconomic characteristics (Awoke, 2004).

To enhance the production and export of floriculture, the government of Ethiopia has been providing different facilities and efficient services by different institutions for the investors. Development Bank of Ethiopia is one of the institutions which enable the government development policies to be realizable. Since floriculture is one of the commercial scale agricultural sub-sector and government's priority area; DBE has been

providing finance almost for half of flower farms which are operating in the country. However, according to the data obtained from central data base of DBE as of June 30, 2013 among 54 floriculture projects, more than half of them delayed repayment of loan instalments. This has an impact on the sustainable provision of credit to the potential investors and existence of the bank as a financial institution. It is therefore, important for the financial institutions to devise means to reduce the levels of loan default. This can be achieved if they know the factors that influence loan repayment behaviours. Therefore, the questions this study seeks to answer are:

- What factors are critical in improving loan repayment performance of floriculture growers?
- What is the relative importance's of factors affecting loan repayment performance of floriculture growers?

### **1.3. Objective of the Study**

This study focuses on the Development Bank of Ethiopia which grants loan to government priority area projects such as floriculture sub sector. The general objective of the study is to analyze factors affecting loan repayment performance of DBE financed flower growers. The specific objectives are:

- To identify critical factors in improving loan repayment performance of floriculture growers.
- To determine the relative importance of factors affecting loan repayment performance of floriculture growers.
- To recommend the likely policy implication based on the findings of the study.

### **1.4. Significance of the Study**

DBE is one of the state owned financial institutions discouraged by low repayment performance of floricultural loan. This has an impact on the sustainable provision of credit to the potential investors and existence of the bank as a financial institution. It is therefore, important for the financial institutions to devise means to reduce the levels of loan default. This can be achieved if they know the factors that influence Floriculture loan repayment performance. Thus, the study will help for future adjustment and improve literature on this

specific issue. In addition; the study is expected to generate pertinent information for different stakeholders and financial institutions. Furthermore, this effort is important for policy formulation and implementation.

### **1.5. Delimitation/Scope of the Study**

The scope of the study was restricted to floriculture farms financed by DBE. Although, other financial institutions have also been engaged in financing floriculture projects; the study had not incorporated floriculture farms financed by other financial institutions due to time and financial constraints. Despite the aforementioned limitations, the study was undertaken to meet its objectives.

### **1.6. Organization of the Thesis**

The thesis is organized into five chapters. The first chapter consists of background of the study, statement of the problem, objectives of the study, significance of the study, and delimitations of the study. The second chapter reviews the literatures relevant to the study which includes theoretical and empirical studies. Brief description of methodology that is the population and sampling technique of the study; the sources of data; the data collection tools/instruments employed; the procedures of data collection; and the methods of data analysis are presented in the third chapter. The results and discussions of the findings are presented in chapter four. Finally, the conclusion and policy implication of the study are presented in chapter five.



## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1. Definitions and an Overview of Global Floriculture Industry**

Floriculture is a class of horticulture that deals with the science and practice of cultivating and arranging of ornamental flowering plants for aesthetic purpose (Acquaah, 2004). It is the science and practice of growing, harvesting, storing, designing and marketing of ornamental plants. It also involves the intensive production of flowers and ornamental shrubs (Muthoka and Muriithi, 2008). Hence floricultural plants are classified by the use of cut flowers, potted plants, foliage plants and bedding plants grown in a controlled environment (Barden, Gordon, and Dave, 1987).

The present day flower industry is a dynamic and highly international industry. Significant growth rates have been achieved during the past few decades. Trade is dominated by south-north flows with Europe and North-America housing the world's largest consumer markets, while the producing countries are situated close to the equator. For the past ten years, the leading flower exporting countries have been the Netherlands, Colombia, Kenya, Ecuador and Israel. Since a few years, Ethiopia has joined this list, while Israel's position has weakened.

Nowadays, the market is characterized by the existence of a multitude of standards in the form of certification schemes, codes of practice and a handful of consumer labels. One of the reasons for this large number of co-existing certificates is the fact that retailers tend to adopt those standards which best meet their needs. There is even a strong trend among large retailers to set up their own private standards. So, although fragmented, the importance of standards in the European flower is increasing (ProVerde, 2010).

It is expected that high-tech developments and ever stricter requirements for suppliers continue in the future and will increasingly determine who is allowed to participate in these chains. Further growth of flower cultivation in East Africa will depend for a large part on the ability to adapt to these changing conditions (Milco, 2011).

## 2.2. Policies and Incentives towards Floriculture

In a recent World Bank Technical Paper (Jaeger 2010), it is argued that a commercial horticulture sector needs government policies that provide an environment in which the sector can thrive. It does not need direct intervention from the government in its activities; rather government should recognize the need for a vigorous private sector as the engine of commercial growth. Five areas are identified in which government policy can provide an active support to commercial horticulture:

**Infrastructure:** A usable transport infrastructure is critical. Not only do poor roads increase transaction costs, but produce is highly perishable and often easily damaged. Secondly, airport services, including cold store facilities, need to be adequate to secure a closed cold chain. Lastly, improvements to the infrastructure of water, health services and education all lend support to developments of the rural economy.

**Investment:** Government must recognize the importance of investment both from domestic sources and foreign investors. It is the larger farms that drive the sector forward that will provide employment and generate the critical mass to attract buyers and transporters. In particular it is important to recognize the potential contribution from foreign investors who bring in not just funds but also technical knowhow as well as management expertise and very likely market linkages too.

**Institutional:** institutional coordination and innovation are the hardest aspects of directing government policy. For the business community it is important to reduce the bureaucratic overhead that adds to the cost of doing business.

**Innovation:** a key component of competitiveness is the ability to innovate. Without an innovative capacity any industry will fall behind its competitors. Innovation can be encouraged by:

- Innovative companies might be given tax relief on their research and development spending.
- The government might bring in specific technical assistance where there are particular problems.
- An active agricultural research programme delivered through a widespread extension service.

**Human capital:** The other important constraint is often the quality of the workforce. The training of unskilled labour puts a major cost onto any flower farm. The shortage of

supervisors and middle-managers can be critical to the survival of a flower industry. Training schemes to encourage the development of middle-management are needed. And finally senior management: export horticulture in particular demands a set of managerial skills that are not readily available. Foreign investment is often important to bring in this capability.

The driving forces for horticultural development can be classified into internal and external factors, which can or cannot be controlled by individual companies, organizations or governments. Particularly external factors like climate, currency exchange rates and oil price fluctuations have shown to have a major impact on the competitiveness of companies active in the flower business.

Internal factors are determined in the first place by entrepreneurs themselves, but also governments and sector organizations have played an important role. Other relevant actors are research and training institutes, credit and finance institutions, quality and regulatory agencies, and trade and investment promotion agencies. In some countries, the government plays an important role in coordinating efforts of various actors (Milco, 2011).

## **2.3. Floriculture Industry in Ethiopia**

### **2.3.1. Development of floriculture industry in Ethiopia**

Until 2004, there was no significant flower industry in the country. State farms started to export cut flowers to Europe in 1980, but the scale of the cut flower industry has drastically expanded since the mid-2000s (The Embassy of Japan in Ethiopia 2008; Getu, 2009).

Ethiopia is endowed with several agro-ecological zones- and opportunity to grow varieties of flowers throughout the year. Gypsophilia, hypericum, eryngium, carnations, cala, agapanthus, freesia, and lilies are produced. Rose is the widely produced variety; Ethiopia is producer of all bud size roses. The highland climate enables production of large budded and long stemmed roses with vibrant colors. Currently, more than 120 foreign and local companies are engaged in the cultivation of horticultural export products. The majority of the companies operating in the sector are owned by foreign investors in the form of sole proprietorship or partnerships. Out of the total number of horticulture producers and

exporters, about 80% are engaged in the floriculture business, whereas the remaining 20% are involved in the development of vegetables and fruit. The total land developed for the flower production currently is 1442.4 hectares (EHDA, 2012).

Flowers are exported mainly to Holland, Germany, and the UK but as well to Scandinavia, Russia, Japan, and the Middle East countries. However, due to European market demand, the peak export season is confined between October to May. Many ornamental plants are produced and exported to international distributors in Europe and North America (DBE, 2013).

Ethiopia is the second largest flower producer in Africa next to Kenya and sixth in the world after Holland, Colombia, Ecuador, Kenya and Israel. There are different varieties of flowers grown in the country. The foreign exchange income from floriculture sub-sector had shown a very dramatic growth in Ethiopia, even surpassing most African nations that had an established operation long before Ethiopia started growing flowers. The floriculture sub-sector had started growing fast from about 111.26 million USD in 2007/08 doubled to 212.56.26 million in, 2011/12. Besides, Investments by floricultural companies have created employment opportunities for 50,493 workers; from this DBE financed projects created job opportunity for 16,512 individuals. The labour intensive process required for seeding, cultivating, packing and exporting makes the floriculture sector unique in absorbing a huge labor force (EHDA, 2012). In the year 2010/2011, flower is one of the top ten foreign exchange earning commodities (MoFED, 2011).

Ethiopia has agro-climatic conditions well-suited for flower cultivation, which are even superior to those in neighbouring Kenya (Bolo, 2007; The Embassy of Japan in Ethiopia 2008; Getu, 2009; Gebreeyesus and Iizuka, 2010). Ethiopia has wide underdeveloped highlands around its capital city, Addis Ababa, a climate of high daily temperature and cool nights, and sufficient sunlight and rainfall, which are all favourable for flower production. In addition, the country has an abundant labor supply with a low wage rate, compared to other African countries.

The strong initiative of the Ethiopian government has also contributed to the development of the cut flower industry (The Embassy of Japan in Ethiopia 2008; Getu, 2009). The government exempted profit tax for the first five years of a farm's operation, exempted

export tax as well as duties on imports of capital goods and raw materials, revised the investment law to attract foreign investors, leased land with basic utilities at low prices, and provided generous long-term loans through the Development Bank of Ethiopia. AS a result, the investment climate in Ethiopia has tremendously improved over the mid-2000s, which has led to substantial capital inflow into the industry.

Another factor is the international shift of production sites from Kenya caused by the water pollution in Naivasha Lake in Kenya and the expiration of the ACP/EU Cotonou Partnership Agreement for Kenya in 2008 (Bolo, 2007). The growers in Kenya had to bear additional costs to avoid further environmental deterioration, resulting in a decline in the competitiveness of the Kenyan cut flower industry, whereas Ethiopia adopted a code of conduct for the sector in 2007 before its environmental effect becomes a serious issue (The Embassy of Japan in Ethiopia 2008; Getu, 2009; Gebreeyesus and Iizuka, 2010). Furthermore, the exemption of EU tariffs on flower exports from Kenya expired in January 2008, whereas Ethiopia is still exempt from the tariffs. In addition, after the presidential election in December 2007, Kenya experienced political violence in many areas including Naivasha, where many flower farms operate (Yamano and Tanaka, 2010). Experts believe that the violence has caused some flower farms in Kenya to relocate their production sites to Ethiopia.

Innovation in the flower industry is largely driven by foreign investors. Ethiopian investors, however, have been able to emulate their business models. Most roses are sold through the Dutch auctions. Only a limited number of firms sell directly to wholesalers and supermarket channel. Few rose growers have developed their own marketing or partnerships arrangements in the export markets (GDS, 2011).

Despite the fact that, the floriculture investment registered significant Contribution in the form of hard currency, employment creation and others; Challenges and other related problems also have been reported related to the transportation, customs, infrastructure and DBE's service quality. Among DBE related problems are: time taking loan process, an out dated cost assumption, arbitrary budget allocation while conducting feasibility study and poor financial reporting system. In addition, the following challenges are also emanated from the transportation and customs facilities i.e. high freight rate, very limited cold storage facilities, lack of proper handling flowers at airports and customs, and time taking

customs procedures. Problems related to the country's infrastructure include: lack of good communication system such as interrupted mobile networks and very poor internet connectivity, and power cuts are the major (DBE, 2013).

### **2.3.2. Policy and policy guidelines of floriculture industry in Ethiopia**

The Ethiopian government has played a crucial role in the impressive growth of the floriculture sector. Development of horticulture has become one of the top priorities of the Ethiopian government. Prior to 2003, however, there were few programs specifically targeting the flower industry. The export promotion strategy adopted in 1998 made no mention of the flower industry. Although the flower industry might have benefited from this broad export promotion support scheme, take-off did not occur until industry specific support was provided by government (Gebreyesus and Iizulka, 2010).

When the success of pioneering firms became evident and the Ethiopian Horticulture Producers and Exporters Association (EHPEA) were formed to lobby the government, additional incentives were made available. By the end of 2002, government realised the opportunity offered by the flower industry and actively engage in promoting the sector.

As described in more detail in Ethiopia's position paper on the impact of taxes (VC3), the Ethiopian government has introduced various measures and launched an all-out effort towards developing the flower industry. They created attractive conditions for farmers to start in Ethiopia: low land rent, income tax exemption of five years. The government also provided long-term credit on very generous terms through the Development Bank of Ethiopia. Investors could borrow up to 70:30 debt-equity ratios with no collateral requirement (the fixed assets of the project itself is the collateral for the loans granted) and against low interest rates i.e. 8.5%.

Government has been engaged also in upgrading and formalizing the institutions responsible for the sector. Until recently, Ministry of Trade (MoT) dealt with the private sector in the flower industry. In 2002, it established a Horticulture Development Team which, in 2008, was upgraded to the Ethiopian Horticulture Development Agency (EHDA) with the aim of providing faster and more coherent services for horticulture exporters. The new agency is under the Ministry of Agriculture and Rural Development. It

has its own budget and freedom to hire staff without being bound by the general rules of the civil service. The idea of creating such a semi-autonomous unit was to offer one-stop services for investors in order to avoid cumbersome transactions with several layers of bureaucracy (Altenburg, 2010).

Also EHPEA has been a major force behind the growth of the industry. Its main goal is to promote and safeguard the sustainable and competitive position of the Ethiopian flower industry. By using its logo 'The New Face of Ethiopia' and by focusing on sustainable production, Ethiopia is gaining more and more acceptance on international markets (Ploeg, 2009).

In sum, promotion of the newly emerging cut flower industry has benefited considerably from export incentives and the good relationships between firms, the sector association, and public authorities, which have helped to remove obstacles. According to Altenburg (2010), the generous incentives offered to flower exporters come at a considerable cost. In addition to foregone taxes, the lease rate for land implies an extraordinary hidden subsidy. In principle, such subsidies are justified as long as investors help to discover new business opportunities that can be emulated by others.

#### **2.4. Definition and Concepts of Credit**

Credit is defined as the power or ability to obtain good and service in exchange for promise to pay for them later (Beckman and Foster, 1969). In a similar manner, credit is the power or ability to obtain money, by the borrowing process, in return for the promises to repay the obligation in the future. Credit is necessary in a dynamic economy because of time elapse between the production of good and its ultimate sale and consumption. The risk in extending credit is the probability that future payment by the borrower will not be made. Futurity is thus a basic characteristic of credit and risk is necessarily associated with the time element.

According to the financial institutions, formal financial institutions are regulated by central bank supervisory authority for licensing and credit policy implementation. They usually use legal documents or legal systems to enforce contracts. Formal loans are those disbursed by financial institutions that are setup and legally engaged in the provision of

credit and mobilization of saving. In the Ethiopia context, these institutions are regulated and controlled by the National Bank of Ethiopia (NBE). On the contrary informal loans are provided by individuals, organizations and institutions that operate outside the legal banking system and control of the national bank. According to Bekelle, 1995, informal credit sources are categorized as commercial (those who lend money on short term basis to obtain profit) and non commercial (lenders that generally include friends, relatives and neighbors). Mutual help associations including Iddir, Iqqub, modern cooperatives, NGOs, etc. categorized on the potential source of informal financial service.

Non-defaulters are credit worthy borrowers who settled the debt amount on the due date signed on the contract. This implies that the clients are committed on the agreements made with the lending institution. Defaulters are non credit worthy borrowers who breach their loan contract and have repayment problem on the due date (Hunte, 1996).

## **2.5. The Nature and Role of Credit Market**

Finance is central to establish and operate productive activity. Sufficient finance is prerequisite for proper organization of production, acquiring of investment assets and/or raw materials and development of marketing outlets etc. Credit is a device for facilitating transfer of purchasing power from one individual or organization to another. As indicated by Oyatoya(1983) credit provides the basis for increased production efficiency through specialization of functions thus bringing together in a more productive union the skilled labor force with small financial resources and those who have substantial resources but lack entrepreneurial ability.

The link between credit and economic development has captured the attention of economists since long (Schumpeter, 1933). With improved financial intermediation, the proportion of financial savings that is diverted by the financial system into non-productive uses falls, and the rate of capital accumulation increases for a given saving rate (Mensah, 1999). He further elaborates the importance of financial intermediation as it enhances saving mobilization by providing a variety of safe financial instruments to savers and ensuring tangible returns on savings. The financial sector contributes to the efficiency of the entire economy by spreading information about expectations and allocation of resources to investors.



In more explicit analysis of the association between finance and economic development Schumpeter (1933) treated the banking system and entrepreneurship as the two key enabling agents of development. Schumpeter argues that the banking system's capacity to supply initiative and entrepreneurship in addition to credit creation enabled it to transfer resources from less productive uses to more economically rewarding uses because those who control existing resource or have claims on current wealth are not necessarily those best suited to use these resources. The banking system credit creation equipped entrepreneurs with purchasing power with which they were able to express overriding command over real productive resources. Financial theorists argue that if economic units relied completely on self-finance, investment will be constrained by the ability and willingness of each unit to save, as well as by its capacity and readiness to invest (Mensah, 1999). In his contribution to the role of financial institutions, Von Pische (1991) admitted that even though finance is a catalyst for investment, it is also a catalyst for poor investment, political patronage, corruption and other types of opportunism.

A credit market differs from standard markets (for goods and services) in two important aspects. First standard markets, which are the focus of classical competitive theory, involve a number of agents who are buying and selling a homogeneous commodity. Second in standard markets, the delivery of a commodity by a seller and payment for the commodity by a buyer occur simultaneously. In contrast, credit received today by an individual or firm in exchange for a promise of repayment in the future. But one person's promise is not as good as another. Promises are frequently broken and there may be no objective way to determine the likelihood that promise will be kept (Jaffee and Stiglitz, 1990).

Banks in many developing countries hold a truly alarming volume in non-performing assets. Differences between promised and actual repayments on loans are the result of uncertainty concerning the borrowers' ability or willingness to make the repayments when they are due which creates the risk of borrowers default (Kitchen, 1989; Pischke, 1991; Vigano, 1993). The inapplicability of the standard demand and supply model for credit market give rise to credit rationing phenomena. Credit rationing as defined by Jaffee (1971) is the difference between the quantity of loans demanded and loans supplied at the

ruling interest rate. In this case lending institutions make use of their own screening criteria to identify credit worthy borrowers so as to decrease the probability of default.

## **2.6. Credit Management Policies**

In the past decades there have been major advances in theoretical understanding of the workings of credit markets. These advances have evolved from a paradigm that emphasizes the problems of imperfect information and imperfect enforcement (Hoff and Stieglitz, 1999). They pointed out that borrowers and lenders may have differential access to information concerning a project's risk, they may form different appraisals of the risk. What is clearly observed in credit markets is asymmetric information where the borrower knows the expected return and risk of his project, whereas the lender knows only the expected return and risk of the average project in the economy.

Lending institutions are faced with four major problems in the course of undertaking credit activity: a) to ascertain what kind of risk the potential borrower is (adverse selection), b) to make sure the borrower will utilize the loan properly once made, so that he will be able to repay it (moral hazard), c) to learn how the project really did in case the borrower declares his inability to repay and d) to find methods to force the borrower to repay the loan if the borrower is reluctant to do so (enforcement) (Ghatak and Guinnane, 1999).

These problems of imperfect information and enforcement lead to inefficiency of credit markets which in turn leads to default. Thorough credit assessment that takes into account the borrower's character, collateral, capacity, capital and condition (what is normally referred to in the banking circles as the 5C's) should be conducted if they are to minimize credit risk.

Mensah (1999) stressed the importance of credit management as follows: credit management process deserves special emphasis because proper credit management greatly influences the success or failure of financial institutions. An understanding of a bank's credit risk management process provides a leading indicator of the quality of a bank's loan portfolio. The key elements of effective credit management therefore are well developed credit policies and procedures; strong portfolio management; effective credit controls and

the most crucial of all a well trained staff that is qualified to implement the system. Financial institutions must maintain basic credit standards if they are to function well and make credit available to investors. These standards include a thorough knowledge of the borrowers' business by the officer in charge; reasonable debt equity ratio; marketability and viability of the investment project and other technical capabilities. Credit analysis is in general vital for the officer to judge about the credit worthiness of the borrower as well as the project to which the loan is injected.

Credit risk evaluation is a complex process, which implies a careful analysis of information regarding the borrower in order to estimate the probability that the loan will be regularly repaid (Vigano, 1993). The probability of regular repayment depends on objective factors related to the borrower's operating environment, the borrower's personal attitude towards loan obligation, and the bank's ability to evaluate these two aspects through the information it has and to control credit risk specific contractual conditions. Vigano summarized factors affecting credit risk as follows: the customer's ability and willingness to pay, presence of favorable external conditions, quality of information and bank's ability to ensure the customers willingness to pay.

## **2.7. Banks Credit Policy in Ethiopia**

The formal and informal financial sectors are the principal sources of finance for any investment or business that can be undertaken at micro, small-scale and large-scale levels in an economy. As Dejene (1993) noted, because of the elaborate paper work, bureaucratic lending procedures and stringent collateral requirements, the formal financial institution do not deliver credit as and when needed. Moreover they operate at high transaction costs.

### **2.7.1. Banks credit policy during the Derg regime**

According to Gebrehiwot(1998), during the Derg regime all financial institutions (except the Saving Associations, whose asset shares do not exceed 1% of the sector's assets and whose loan services are limited to their members) were publicly owned and entry was restricted, there by establishing a public monopoly in the financial sector. Moreover, the financial system has been segmented with the financial institution having specialized

functions; specialization not based on efficiency in risk and transaction cost considerations: individually institutions have been operating in specific sector allocated to them, each enjoying a monopoly in its segment.

According to this definition, there were two specialized financial institution namely Housing and Saving Bank (HSB) and Agricultural and Industrial Development Bank (AIDB) in the regime. The HSB specialized on the provision of loan for residential and commercial construction industries. In addition, the HSB was mobilizing time deposits, and accepted the deposits of Ethiopian Insurance Corporation and Pension and Social Security Authority (PSSA) as per the order of the government.

The second specialized bank during the period was Agricultural and Industrial Development Bank (AIDB) which specialized in development loans by raising fund only through borrowing (both foreign and domestic ) and time deposit. In addition, AIDB with its 16 branches and 15 sub-branches outside Addis Ababa provided short term credit for purchasing of fertilizers, improved seeds, etc; as well as long term credit for investment (Birhanu and Befekadu, 1999). The credit policy of the bank was administratively allocated; mainly to the socialized sector (i.e. public enterprise, state farms and cooperatives). In similar manner interest rates on loans to different economic and social sectors were administratively fixed. The NBE set lending rates ranging from 4.5% to 9.5% depending on the ownership and type of sector that provides the loan. Due to the economic policy of the Derg (i.e. socialist) the interest rate favored the public investment rather than the private investment which was regarded as adversary to the economy in that period (Gebrehiwot, 1998).

### **2.7.2. Banks credit policy post 1991**

After the downfall of the military government in May 1991, the transitional government of Ethiopia (TGE) took unusual step of distributing its draft economic policy to public comment. This economic policy clearly defined the role of the state in the economy; explicitly acknowledged state control over the entire economy as the major cause of economic decline and the need to shrink that role and in steady broaden the scope of private sector participation in the economy (Gebrehiwot, 1998).

Following this market-oriented economic policy designed by the Transition Government of Ethiopia, financial sector reform and liberalization under the existing financial institution was one among several reforms. The reform included elimination of priority access to credit, liberalization of interest rates, restructuring including portfolio cleaning and recapitalization of state owned banks, introduction of use of profitability criteria by financial institution, reduced direct government controls of financial intermediaries and limits on loans to the government both by the NBE and Banks, enhancement of the supervisory, regulatory, legal infrastructure and power of the NBE, allowing private financial institution and introduction of treasury bill auction market (Gebrehiwot, 1998). Prior to 1992, the interest rate charged to farmers' cooperatives was 5%, which was below the rate of savings deposit (6%). Financial institutions were obliged to pay interest margin on deposits from their own resource. This had a negative effect on the capital base of the banks.

Discrimination of credit access and interest rate by type of ownership (i.e., among state owned enterprise, cooperatives and private firms) was eliminated. Similarly sectoral interest rates discrimination was reduced and domestic establishment of private financial institutions were allowed and encouraged through proclamation number 29/1992.

Furthermore, the state owned banks have been restructured both financially and operationally. Changes in corporate governance have been introduced; banks have management autonomy to take the responsibility of day to day banking operation and each bank has its own board which is responsible for the overall banking activity in line with the policy guideline. In addition, the banks introduced incentive systems for their employees to enable the banks operate in a competitive environment and commercial profitability criteria. They have been recapitalized to improve their solvency. Their portfolios were improved by cleaning up non-performing loans to Public Enterprise and Cooperatives during the Derg regime through debt socialization (i.e. banks received government bonds to replace Non-performing loans); This partly enabled them to compete with new private banks which start from a clean balance sheet, prevented the emergency of moral hazard in banks and the indebted public enterprises and it created opportunity for banks to cut off insolvent client should they choose to (Ibid, 1998).

Moreover, according to the regulations No. 200/1994, 202/1994 and 203/1994, the banks have been converted into universal banks (*i.e.* allowed to do both commercial banking and brokerage, sale shares as agents, and participate in equity investment). Restrictions on their portfolio of loan granting sector and financial instruments have been removed; banks are no longer required to specialize their credit service to certain sector of the economy or hold government bond. In addition banks have decentralized loan decision-making which has an advantage on both the institution and the client. On the bank side, it reduced transaction cost of lending, shortened the time taken screening viable project and reduced the cost of provision (*i.e.* minimizing the default risk through frequent follow up before calculating the provision expense on the outstanding balance). In the side of the borrower it reduced the finding cost of loan approval body and other related expense to process the loan, and it shortened the loan processing time (Ibid, 1998).

Development Bank of Ethiopia (DBE) has been serving the national economy as development finance institution for a century. During this time, there were three notable credit policy of the current DBE. The first credit policy formulated in 1973 at the time of the merger of the ex-Ethiopian Investment Corporation and the then Agriculture and Development Bank of Ethiopia. The main objective of the credit policy was to facilitate the provision of credit service mainly to the private sector to enhance the socio-economic development of the country. The second, policy was formulated in 1976, after the establishment of the socialist oriented government. The main objective was to facilitate the provision of supply led and policy directed credit to the socialized sector of the economy. The third policy was issued by the then DBE's Board of Management (BOM) in 1999 following the restructuring and re-organization tasks of the bank. The new credit policy mainly targeted the facilitation of credit service provision for the private sector development on the basis of national development goals and institutional sustainability. After the final credit policy was issued in 1999, there was no major shift in policy but there were a number of adjustments at different times in order to provide customer focused credit facility and mitigating risk factors that hinder the sustainability of the bank.

**Area of lending:** DBE's main area of focus is the provision of medium and long term loans for investment projects in the government priority areas. In line with the Agriculture Development Led Industrialization strategy (ADLI) of the country, the bank provides finance to encourage investment in agriculture and manufacturing industries preferably for

export oriented investment. According to the bank's definition of priority area; Commercial agriculture, manufacturing and agro processing sectors are the major focus areas whether focused on export or not.

**Credit product and services:** the bank has been extending investment credit to creditworthy borrowers and projects that have received a thorough appraisal and found to be financially viable, economically feasible and socially desirable. Depending on the type and nature of the project, the bank extends different products of credit and services to who could invest in economic growth of the country. Some of the credit product and services are:

**Long term loan:** the maximum length of time the bank advances long term loans are fixed at 20 years including any grace period.

**Medium term loan:** a medium term loan is a loan repayable within three to five years including any grace period.

**Working capital loan:** the bank extends this type of loan in order to solve short term cash flow problems of existing customer and to increase capacity utilization of customer. This type of loans are settled within two years from the date of disbursement.

**Co-financing:** in order to maintain the exposure limit, minimize risks and to overcome occasional liquidity problems the bank is involving in financing projects which need very large investment capital under co-financing arrangements with other national or international financial institution.

**Guarantee service:** the bank provides financial guarantee service to its reliable clients especially exports guarantee service.

**Managed fund:** the bank undertakes specific lending operation as a managed fund at the request of governmental and non-governmental agencies in support of development programs/projects.

**Lease financing:** the bank avail loan in the form of lease financing to its clients on the condition of the project must support agriculture and industrialization strategy of the country.

## **2.8. DBE's Credit Experience in Floriculture Industry**

DBE has been financing major flower projects operating in the country. DBE has approved a total loan amount of Birr 1,135,233,079 for 45 flower farms. Out of the total

approved amount 76% or Birr 858,195,492 has been disbursed for 42 flower farms. In this case it has to be understood that this loan amount is not the original approval and disbursement amount to floriculture projects from the inception to date. These figures represent only the existing project loan approval and disbursement amount (DBE, 2013).

Loan collection is one of the core operational activities of the bank. To maintain financial sustainability of the bank it was necessary to engage on collection of loan that was granted to the borrowers. However, the performance of the bank regarding loan collection was poor when compared to the demand of collection in each year. The bank could have collected birr 242.7 million from the sub sectors in the past two year. The amount of loan in arrears during the past two years (2012 to 2013) is presented in Table 1 below.

**Table 1. Amount of floriculture loan in arrears**

Birr in millions

Description	Year				
	2011/12	2012/13	% change	2013/14(July-December,2013)	% change
Loan in Arrears	127.97	104.24	(18.5)	118.16	13.4

Source: DBE central data base (2011/12-2012/13)

The bank has taken continuous and massive rescheduling actions so as to make the projects sustainable. For example during the economic crisis of 2008/2009 the flower projects could have been liquidated, it had not been supported by the massive rescheduling actions of the bank. However, there are some factors which put the sustainability of the sector in doubt, due to different environmental and social factors. Currently the export destinations of flower products are demanding strict pre-conditions that the producers should fulfil to qualify the environmental and social demands of the importing countries. These preconditions, in turn affect the production cost of the farmers and hence the Sustainability of the sub-sector would be endangered. So in addition to rescheduling the loan repayment period, the bank must enact its own code of practice for the subsector and



/or assist the implementation of code of practices being undertaken by the EHPEA (DBE, 2013).

## **2.9. Empirical Studies**

Research in agricultural sector in general and other agricultural sub sectors in particular were used to identify factors that influence loan repayment performance of floriculture growers because the researcher did not get peer-reviewed articles on this specific topic. Accordingly, a number of factors have been raised as systematically influencing loan repayment by different authors in different developing countries. Hence, the review covers only few and important literature for the purpose of grasping what the empirical studies offer are presented as follows.

### **2.9.1. Empirical studies outside Ethiopia**

Empirical work by Arene (1993) revealed income, farm size, age of farmers, farming experience and level of education of farmers contributed positively to the credit worthiness of farmers.

Wongnaa and Awunyo (2013) examined factors affecting loan repayment performance among yam farmers in the Sene District, Ghana .Empirical results from probit analysis showed that education, experience, profit, age, supervision and off-farm income have positive effects on loan repayment performance. Conversely, gender and marriage have negative effects on loan repayment while the effect of household size was found to be ambiguous.

Oladeebo (2008) examined the determinants of loan repayment among smallholder farmers in Ogbomoso Agricultural Zone, Nigeria. Results from multiple regression analysis showed that amount of loan obtained by farmers; years of farming experience with credit and level of education were major factors that positively and significantly influenced loan repayment.

Eze and Ibekwe (2007) examined the determinants of loan repayment under the indigenous financial system in Southeast Nigeria. Empirical results from multiple

regression analysis revealed amount of loan received, age of beneficiary, household size, years of formal education and occupation as important predictors of loan repayment under the system.

Mashatola and Darroch (2003) analyzed the factors affecting the loan status and repayment scheme of sugarcane farmers who received graduated mortgage loan in Kwazulu-Natal, South Africa. Results identified farm size (proxied by annual gross turnover), access to off-farm income, and average annual gross turnover relative to loan size as criteria in selecting potential farmers for such scheme as they provided additional liquidity to fund future operations and debt repayment.

Okorie (1986) examined the major determinants of agricultural smallholder loan repayment in Ondo State, Nigeria. Results identified the nature and timeliness of loan disbursement, the number of supervisory visits by credit officers, profitability of the enterprise on which the loan funds were invested as significant factors that stimulate loan repayment.

Koopahi and Bakhshi (2002) used a discriminate analysis to identify defaulter farmers from non-defaulters of agricultural loan recipients in Iran. Results showed that use of machinery, length of repayment period, bank supervision on the use of loan had significant and positive effect on the agricultural credit repayment performance. In the other hand incidence of natural disasters, higher level of education of the loan recipient and length of waiting time for loan reception had a significant and negative effect on dependent variable.

Jama and Kulundu (1992) in their study on small-holder farmer's credit repayment performance in Kenya used two stages least squares method to deal with endogeneity problem of the loan diversion where the loan repayment was used as an independent variable. Farm income, farmer's attitude toward loan repayment, proper amount of purchased farm input and source of income from farming activity had statistically significant effect on loan repayment performance. They also reported that the proportion of loan funds diverted to non-intended purpose was positively related to the proportion of arrears on loans. In addition late loan issuing and inadequate supervision and advice to farmers were positively related to the proportion of loan diverted.

Okovie (1996) in his study on major determinants of agricultural small-holder loan repayment in Nigeria reported that four factors had a tremendous effect on loan repayment performance. These factors include time of loan disbursement, nature of loan disbursement (in cash or in kind), number of supervisory visits made by credit officers after disbursement and profitability of enterprises on which loan funds were invested.

Matin (1997) in his study on the loan repayment performance of borrower in Bangladesh obtained a significant positive relationship between households asset/income position/ and its loan default status. In his analysis, he related this situation to a very strong demonstration effect where borrowers having relatively small loan size behave in the same way as those who have larger loans. The education status of the household was reported to have strong positive effect on non-defaulter status irrespective of the household's income position. The total operated landholding of the household was the other variable, which was negatively associated with default after certain level.

Hunte (1996) using the logistic model in Guyana showed that certain factors such as activities in fishing, male borrowers in food crop and live-stock credit experience and sugarcane production resulted in low default risk, minimum or low credit rationing (giving nearly the amount the borrower requested or demanded) and high repayment performance. Alternatively, other factors such as extending grace period in loan contracts and long processing times led to high default risk and low repayment. Moreover, the result clearly showed that wealthy borrowers exhibited poor repayment performance.

Vigano (1993) in his study about the case of development bank of Burkina Faso employed a credit scoring model. He found out that being women, married, aged, more business experience, value of assets, timeliness of loan release, small periodical repayments, project diversification and being a preexisting depositor are positively related to loan repayment performance. On the other hand loan in kind, smaller loan than required, long waiting period from application to loan release and availability of other sources of credit were found to have negative relation with loan repayment performance.

Kashuliza (1993) used a linear regression model to analyze determinant of agriculture loan repayment performance in case of southern highland of Tanzania. His study showed that

level of education, attitude towards repayment, farm income and off-farm income positively affected loan repayment with farm income being significant, While age, house hold expenditure and house hold size have negative influence on loan repayment performance with house hold expenditure being significant.

Njoku and Odi (1991) studied determinant of loan repayment under the social emergency loan schemes in Nigeria. Their study showed that late release of loans, complicated loan processing procedure, loan diversion to non-agricultural enterprise which is low enterprise returns resulting from low adoption rate of improved agricultural technology and emphasize on political consideration in loan approvals contributed to poor loan repayment performance of small holders. Loan volume, years of formal education, household size and interest paid on loan were found to positively and significantly affect loan repayment; while years of farming experience, loan period, farm size, farming as a major occupation, farm output and value of assets were found to negatively and significantly affect loan repayment.

Chirwa (1997) used a probit model to estimate the probability of agriculture credit repayment in Malawi. The result indicated that crop sales, income transfers, degree of diversification and quality of information are positively related while size of club was negatively related to the probability of repayment. Other factors like amount of loan, sex, household size and club experience were found to be insignificant.

### **2.9.2. Empirical studies in Ethiopia**

Mulugeta (2010) examined determinants of agricultural loan repayment performance: The case of DBE using Logit model and results showed that the age of borrowers, monitoring /follow-ups made by the bank/, loan issuing time (time taken to process a loan), marital status of borrowers, managerial experience of the project manager and education level of borrowers were statistically significant factors affecting repayment of agriculture loan.

Berhanu (1999) in his study on the project office for the creation of small-scale business opportunities (POCSSBO) in Addis Ababa, used probit model and found that education, timely loan granting and the proportion of loan funds diverted statistically significant. However loan size, number of dependents within the house hold and consumption

expenditure are positively related to loan diversion. He reported that loan diversion and loan size are negatively related to full loan repayment while age is positively related.

Abrham (2002) in his study of determinants of repayment status of borrowers and criteria of credit rationing with reference to private borrowers around Zeway employed a Tobit model and reported that a borrower who has other source of income, education, work experience in related economic activity before the loan and engaging on economic activities other than agriculture has more likely better loan repayment performance than others. In addition he explained that, being male borrower and giving extended loan repayment period have negative impact on loan recovery performance.

Bekele (2001) employed a logistic regression model to analyze the factors influencing loan repayment performance of small holders in Ethiopia. He reported that larger loans had better repayment performance than those who took a smaller one. Further the results revealed that late disbursement of inputs purchased by the loan funds was an important bottleneck in loan repayment while livestock were found to be important in improving the farmers' repayment performance.

Belay (1998) considered in his study twenty eight demographic and socio-economic variables which were hypothesized to influence repayment of fertilizer credit among smallholder farmers in the central highland of Ethiopia, Alemgena district. His result showed that credit experience and loan diversion variables were found to have statistically significant and potential power to discriminate between defaulter and non-defaulter group of the fertilizer borrowers.

Fantahun (2000) hypothesized twenty one socio-economic variables to influence the loan repayment performance of agency for cooperation in research and development's (ACORD) community based organization revolving credit schemes. Accordingly his fitted Tobit model revealed that factors such as the size of loan issued, other income source, loan supervision visit had a positive impact on loan repayment performance.

Belay (2002) examined twelve socio-economic and institutional factors that affect loan repayment performance of rural women in eastern Ethiopia, in case of Dire Dawa Town using a logit model. The result of the study showed that, location of borrowers from

lending institution, loan diversion, annual farm revenue, celebration of social ceremonies, effect of initial group formation and farm size were significantly affect the rural women loan repayment performance.

The studies draw lessons from the review and select variable to be analyzed in the research.

## **CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY**

### **3.1. Population and Sampling Technique**

The research constituted fifty four Floriculture credit borrowers of DBE as a sample for the study. The sample represents the actual floriculture credit borrowers of DBE.

### **3.2. Types of Data and Method of Data Collection**

Secondary data, which is mainly cross-sectional, was collected from Floriculture credit borrowers of DBE. The data were collected from the files of DBE's Floriculture credit borrowers which are not manipulated for other studies. Hence, source of data for the analysis of factors affecting loan repayment performance of the floriculture grower is the individual borrower file and financial reports of the bank. The data's were collected using a standard format prepared for the purpose of collecting all the necessary information from the individual file with the help of a trained data collector.

The data's collected includes socio economic characteristics such as educational status, related farming experience, sustainable floriculture certification status, access to off farm income, amount of loan, ability to pay the loan as per the loan repayment agreement/repayment status of the borrower, loan processing time, farm size, capital structure(equity contribution of the borrower), level of technology used, type of management, number of supervisory visit by the bank's officials and other factors influencing loan repayment by Floriculture growers.

### **3.2. Methods of Data Analysis**

The data's collected for the study were analyzed using both Descriptive and Econometric analysis methods using software called STATA version 11.0

### 3.2.1. Descriptive analysis

The descriptive statistics like the means, percentages, standard deviations and frequency distribution of the variables were used to describe the socio economic characteristics of the respondents. In addition, the t- and chi-square statistics were employed to compare defaulters and non-defaulters group with respect to explanatory variables.

### 3.2.2. Econometric analysis

The floriculture grower's ability to pay for his/her loan at the right time is dichotomized, involving two mutually exclusive alternatives. The floriculture grower is either able to pay for his/her loan at the right time or not. Models for estimating such phenomena in which the dependent variable is binary have been propounded (Madala, 2005; Asante et al., 2011). The framework for such analysis has its root in the threshold theory of decision making in which a reaction occurs only after the strength of a stimulus increases beyond the individual's reaction threshold (Hill and Kau, 1981). This implies that every individual when faced with a choice has a reaction threshold influenced by several factors (Asante et al., 2011). This yields a binary dependent variable,  $y_i$  which takes the values of zero (Floriculture grower's inability to pay for his/her loan(Defaulter)) and one (a floriculture grower able to pay for his/her loan(Non defaulter)).

Non-defaulters are credit worthy borrowers who settled the debt amount on the due date signed on the contract. This implies that the clients are committed on the agreements made with the lending institution. Defaulters are non credit worthy borrowers who breach their loan contract and have repayment problem on the due date (Hunte, 1996).

The probability of observing a value of one is:

$$Pr(Y_i = \frac{1}{x_i\beta_i}) = 1 - F(-x_i\beta_i) \dots\dots\dots (1)$$

Where F is a cumulative distribution function. It is a continuous, strictly increasing function that takes a real value and returns a value which ranges from 0 to 1.



Then, it follows that the probability of observing a value of zero is:

$$P_r(y_i = \frac{0}{x_i\beta_i}) = F(-x_i\beta_i) \dots\dots\dots (2)$$

Given such a specification, we determine the parameters for estimating this model using the maximum likelihood estimation approach. The dependent variable is an unobserved latent variable that is linearly related to  $y_i$  by the equation:

$$y_i = \beta_i x_i + u_i \dots\dots\dots (3)$$

Where  $u_i$  is a random disturbance term. The observed dependent variable is determined by whether  $y_i$  exceeds a threshold value or otherwise:

$$y_i = \begin{cases} 1 & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases} \dots\dots\dots(4)$$

Where  $y_i^*$  is the threshold value for  $y_i$  and is assumed to be normally distributed. Common models for estimating such parameters include probit(standard normal), logit (logistic) and tobit (extreme value) (Madala, 2005; Asante et al, 2011).

**Specification of the probit model**

The study adopted the probit model partly because of its ability to constrain the utility value of the ability to pay for loans variable to lie within 0 and 1, and its ability to resolve the problem of heteroskedasticity. The other advantages of the probit model include believable error term distribution as well as realistic probabilities. Following from Madala (2005) and Asante et al (2011), the probit model adopted for the study is specified as:

$$P_i = P(y_i^* < y_i)$$

$$P_i = P(y_i^* < \beta_0 + \beta_i x_{ji}) = F(y_i) \dots\dots\dots (5)$$

$$P_i = F(y_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{z_i} e^{-\frac{s^2}{2}} ds$$

where  $P_i$  is the probability that an individual will make a certain choice (ability to pay for loans collected at the right time or otherwise);  $s$  is a random variable normally distributed with mean zero and unit variance;  $y_i$  is the dependent variable (ability to pay for loans collected at the right time or otherwise);  $y_i^*$  is the threshold value of the dependent variable. To obtain an estimate of the index  $Z_i$ , the inverse of the cumulative normal function is used:

$$y_i = F^{-1}(P_i) = \beta_0 + \beta_1 x_i + u_i \dots \dots \dots (6)$$

The parameters  $\beta_0, \beta_1, \beta_2, \beta_3, \dots, \beta_k$  of the probit model do not provide direct information about the effect of the changes in the explanatory variables on the probability of a floriculture grower's being able to pay his/her loan alone. The relative effect of each explanatory variable on the likelihood that a borrower will be able to repay his or her loan (marginal effect) is given by:

$$\frac{\partial P_i}{\partial x_{ij}} = \beta_{ij} f(Z_i) \dots \dots \dots (7)$$

Where  $P_i$  is the mean dependent variable whose value is given in the probit results as:

$$f(Z_i) = F^{-1}(P_i) \dots \dots \dots (8)$$

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots \dots \dots + \beta_k X_k \dots \dots \dots (9)$$

$f(Z_i)$  = Density function of the standard normal variable and is given by:

$$f(Z_i) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}Z_i^2} \dots \dots \dots (10)$$

The empirical model is specified as:

$$ATP_i = \beta_0 + \beta_1 EDUS + \beta_2 FAE + \beta_3 AML + \beta_4 NSPV + \beta_5 FSZ + \beta_6 SFC + \beta_7 LTECH + \beta_8 TMGT + \beta_9 OSI + u_i$$

Where  $ATP_i$  (Ability to pay) is the explained variable,  $\beta_0$  is constant,  $\beta_i X_i$ 's are explanatory variables and  $u_i$  is the error term. The detail of each variable is explained in the next sub topic.

### 3.3 Definition and Hypothesis of Variables

#### Dependent (explained) variable

**Ability to pay (ATP):** Measured as a dummy, and takes 1 for all floriculture credit borrowers that have able to repay their loans when due or with in thirty and ninety days (for short term working capital loan and long term loans respectively) from the due date were classified as non defaulters and those who did not able to repay their loans within the above specified days from the due date were all categorized as defaulters and taking a value of 0.

#### Independent (explanatory variables)

**Education status (EDUS):** It is defined as the education status of either the owner or the manager who runs the project. It is a continuous variable and measured in number of years completed. Higher educational levels enable borrowers to comprehend more complex information, keep business records, conduct basic cash flow analysis and generally speaking, make the right business decisions. Hence borrowers with higher levels of education may have higher repayment rates. It is also supported by the findings of Ojiako and Ogbukwa (2012), Eze and Ibekwe (2007), Mulugeta (2010), Amare (2006).

**Farming experience in floriculture (FAE):** It is a continuous variable and measured in Years. It is defined as the floriculture related farming experience of the borrower or the manager to run the project. Borrowers who have been engaged in related business for a long time are expected to be more successful to run the project because they have more

stable sales than those who just started. Thus experienced borrowers may have higher repayment rates. The hypothesis is supported by the findings of Oladeebo (2008), Wongnaa and Awunyo (2013).

**Number of Supervisory project visits (NSPV):** It is a continuous variable and measured in Number of supervisory project visits of the farm by credit officers. Visits by loan officials to borrowers will motivate the farmers to work harder and make sure the loans given to them are not diverted to unintended purposes. Therefore, borrowers who are visited frequently may have higher repayment rates. Same is supported by the empirical studies of Bankhshi and Koopahi (2002), Wongnaa and Awunyo (2013), Fantahun (2000), and Mulugeta(2010).

**Amount of loan (AML):** Defined as the amount of the loan that the bank disburses to the respective borrowers. It is assumed that if the size of the loan is large, it will increase the interest expense on the production process and affect the repayment performance negatively. On the other hand Bekele (2003) noted that, if the production capacity of the project can utilize the loan efficiently, it enhances the loan repayment performance. Hence, the actual sign of the variable will be determined in the analysis.

**Farm size (FSZ):** It is a continuous variable and defined as the size of total land acquired for floriculture development. Some borrowers may use a higher percentage of the loan in clearing an unreasonably large land area and at the end they suffer getting money to meet the other cultural practices. This results in low yield and hence farmers with large farm sizes may have lower repayment rates. On the other hand, empirical study by Arene(1993), Mashotala and Darroch (2003) revealed that farm size contributed positively to the credit worthiness of farmers. Hence, it may have positive or negative impact on ability to pay the loan.

**Sustainable Floriculture Certification (SFC):** Defined as different certification programs awarded to promote environmental stewardship, or sustainable production as well as fair trade and fair labour practices for employees. It is measured as dummy variable which takes the value of 1 if the grower has a multitude of standards in the form of certification schemes, codes of practice and a handful of customer labels and 0 otherwise. It is examined whether sustainable floriculture certification shows significant

relation with loan repayment. It is assumed that the borrower will have more access and compete in the market if certified with sustainable floriculture certificates as a result generate more revenue. This will enable the borrower to repay his/her loan at the right time. Hence the variable is expected to have positive effect on loan repayment.

**Level of technology used (LTECH):** Defined as the level of technology that the flower grower uses interims of improving its productivity and control diseases. It is a dummy variable and takes 1 if the grower used high/advanced level of technology like green houses with automatic Ventilation, computerised irrigation such as smart system and 0 otherwise for those flower growers using manual greenhouse and the like. It is assumed that if the grower used high/advanced technology, temperature will be adjusted as needed so as shorten production cycle and increase production, safe from disease, lower maintenance cost and create suitable environment to sustain production even in summer season. Thus, will generate more revenue and will repay the loan on time. Therefore, it is expected to have positive correlation with loan repayment. It is supported by the empirical studies of Njoku and Odii (1991).

**Type of management (TMGT):** It is defined as the type project manager (either owner or employed) who is responsible for the overall operation of the project. It is a dummy variable which takes 1 if the project is managed by the owner and 0 otherwise. It is assumed that if the project managed by the owner, he/she could take the responsibility and make correction timely when faced different problems. This makes the project to be sustainable. This in turn has a positive impact on the dependent variable. Hence, type of management is expected to have positive sign.

**Other source of income (OSI):** It is defined as income derived from other business activities outside the flower farm established by DBE loan. It is measured as a dummy, 1 if the borrower has other source of income and 0 otherwise. Borrowers with other sources of income may make loan repayment from the proceeds of those jobs. Thus farmers with other sources of income may have higher repayment rates. It is supported by the empirical studies of Authors Abraham (2002), Wongnaa and Awunyo, (2013), Mashotala and Darroch(2003).

**Table 2. Summary of variables used in probit model**

<b>Variable</b>	<b>Type and Definitions</b>	<b>Measurement</b>
<b>Dependent</b>		
ATP	Dummy, ability to pay	1 if yes , 0 otherwise
<b>Explanatory</b>		
EDUS	Continuous, education status	Number of years completed
FAE	Continuous , farming experience in floriculture	In years
NSPV	Continuous , follow ups/supervisions by bank’s loan officers	In number
OSI	Dummy ,Income derived from other business	1= yes,0 = No
AML	Continuous ,Amount of loan disbursed to the borrower	In birr
FSZ	Continuous ,total farm size	In Hectare
SFC	Dummy , floriculture certification status	1= certified,0= not certified
LTECH	Dummy, Level of technology used	1=advanced,0=otherwise
TMGT	Dummy, Type of management	1=managed by owner,0=otherwise

Source: Own Definition (2014)

## CHAPTER FOUR: RESULTS AND DISSCUSSION

This section presents the findings of the study using both descriptive and econometric analyses. The results of descriptive analysis are presented in the form of mean, percentages, standard deviations and frequency distribution. In addition, the t-test (for continuous variables) and chi-square statistics (for categorical variables) were employed to compare defaulters and non-defaulters group with respect to explanatory variables. Econometric analysis was carried out to identify the most important factors that affect loan repayment performance of flower growers and measure the relative importance of significant explanatory variables on loan repayment.

### 4.1. Demographic and Socio-Economic Characteristics of Floriculture Growers

#### 4.1.1. Education status

Table 3 below summarizes the educational status of the owner or the manager of the flower project. The result revealed that, of all the borrowers, about 87% attended diploma or above level education whereas about 13% of them attend less or equals to 12<sup>th</sup> grade.

**Table 3. Education level of floriculture growers**

Education	Non-defaulters		Defaulters		Total		t-value
	Frequency	%	Frequency	%	Frequency	%	
≤ 12	1	3.8	6	21.4	7	13	-3.98***
Certificate and Diploma(13-15)	1	3.8	9	32.1	10	18.5	
Degree and above(> 15)	24	92.3	13	46.4	37	68.5	
Total	26	100	28	100	54	100	
Mean	16.88		14.07		15.43		
Std. deviation	2.03		3.02		2.94		

\*\*\*significant at 1% probability level

Source: Own compilation (2014)

The result shows that, about 4% of non defaulters and 21% of defaulter borrowers attended less than or equal to 12<sup>th</sup> grade .On the other hand, about 96% of non defaulters

and 75% of defaulters attended at least junior college education. From this we can understand that the probability of defaulters and non defaulters in this sample had junior college education and above is 0.75 and 0.96 respectively. This implies that floriculture growers with higher education have more probability of being non defaulter. The difference between the defaulters and non-defaulters with regard to education status of borrowers were statistically significant at 1% probability level (Table 3).

#### 4.1.2. Farm size

**Table 4. Farm size of floriculture growers**

Farm size	Non-defaulters		Defaulters		Total		t-value
	Frequency	%	Frequency	%	Frequency	%	
≤ 20	9	34.6	15	53.6	24	44.4	-1.99*
21-40	14	53.8	11	39.3	25	46.3	
> 40	3	11.5	2	7.1	5	9.3	
Total	26	100	28	100	54	100	
Mean	33.42		22.5		27.7554		
Std. deviation	26.22		12.19		20.7030		

\*significant at 10% probability level

Source: Own compilation (2014)

The study result shows on average each flower growers had a farm size of 27.87 hectares. The minimum and maximum farm sizes were 10 hectare and 124 hectares respectively. Group wise on average non defaulters had a farm size of around 33 hectares where as defaulter floriculture credit borrower has a farm size of around 23 hectares. This means floriculture grower with more farm size has likely to repay the loan if the borrower is credit worthy. The mean difference between the defaulters and non defaulters in terms of farm size were statistically significant at 10% probability level (Table 4).

#### 4.1.3. Sustainable floriculture certification status

Table 5 summarizes the certification status of flower growers. The result revealed that, of all the borrowers, about 52% has not certified with sustainable floriculture certification.



The remaining about 48% of flower growers are certified with a multitude of standards in the form of certification schemes, codes of practice and a handful of consumer labels. This means only about 48% of flower growers met the requirements in line with environmental stewardship, or sustainable production and fair labor practices which best meet customer needs and will get more market access as a result generate more revenue.

**Table 5. Certification status of floriculture growers**

Certification status	Non-defaulters		Defaulters		Total		$\chi^2$ - value
	Frequency	%	Frequency	%	Frequency	%	
Not cert.	7	26.9	21	75	28	51.9	12.48***
Certified	19	73.1	7	25	26	48.1	
Total	26	100	28	100	54	100	

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

Source: Own compilation (2014)

Group wise, about 27% of non defaulters and about 75% of defaulters were not certified with sustainable floriculture certification. On the other hand, about 73% of non defaulters and about 25% of defaulters got certified. From this we can understand that the probability of defaulters and non defaulters in this sample had certified with sustainable floriculture certification is 0.25 and 0.73 respectively. This implies that certified floriculture growers have more probability of being non defaulter. The difference between the defaulters and non defaulters with regard to sustainable floriculture certification of flower growers were statistically significant at 1% probability level (Table 5).

#### **4.1.4. Level of technology used**

Table 6 shows about 39% of the flower growers used advanced level of technology i.e green houses with automatic ventilation, computerised irrigation such as smart system and about 61% of flower growers used manual technology like manual irrigation system and the like.

**Table 6. Proportion of flower growers by level of technology used**

Technology	Non-defaulters		Defaulters		Total		$\chi^2$ - value
	Frequency	%	Frequency	%	Frequency	%	
Advanced	18	69.2	3	10.7	21	38.9	19.42***
Manual	8	30.8	25	89.3	33	61.1	
Total	26	100	28	100	54	100	

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

Source: Own compilation (2014)

Group wise, about 69% of non defaulters and about 11% of defaulters used advanced technology. On the other hand, about 31% of non defaulters and about 89% of defaulters were used manual technology. From this we can understand that the probability of defaulters and non defaulters in this sample, used manual technology is 0.89 and 0.31 respectively. This implies that floriculture growers who used manual technology have more probability of being defaulter. This means those flower growers who used advanced technology controls the production process easily and more likely to repay the loan. The difference between the defaulters and non defaulters with regard to level of technology used were statistically significant at 1% probability level (Table 6) .

#### 4.1.5. Farming experience

Experience is crucial element for the success of business project running. Similarly DBE appraises the farming experience whether the floriculture credit borrower is capable or not to manage the business successfully. According to the results of this study, the average farming experience of the grower whether employed or business owned was about 8 years. The minimum and maximum managerial experience was zero and twenty two years, respectively.

**Table 7. Farming experience of flower growers**

Experience (years)	Non-defaulters		Defaulters		Total		t-value
	Frequency	%	Frequency	%	Frequency	%	
≤ 10	9	34.6	26	92.9	35	64.8	-5.4***
>10	17	65.4	2	7.1	19	35.2	
Total	26	100	28	100	54	100	
Mean	11.12		4.18		7.5185		
Std. deviation	5.42		3.94		5.833		

\*\*\*significant at 1% probability level

Source: Own compilation (2014)

Group wise, the average farming experience of the grower was about 11 years and 4 years for non defaulters and defaulters respectively. The difference between non defaulters and defaulters in terms of number of years of farming experience was statistically significant at 1% probability level (Table 7).

#### 4.1.6. Type of management

It is defined as the type project manager (either owner or employed) who is responsible for the overall operation of the project.

**Table 8. Proportion of floriculture growers by type of management**

Manager	Non-defaulters		Defaulters		Total		$\chi^2$ -value
	Frequency	%	Frequency	%	Frequency	%	
Employed	14	53.8	7	25.0	21	38.9	4.720**
Owned	12	46.2	21	75.0	33	61.1	
Total	26	100	28	100	54	100	

\*\* Significant at 10% probability level

Source: Own compilation (2014)

The analysis shows that, about 61% of flower projects financed by DBE were managed by owners whereas about 39% were managed by employed managers. It was also found that, about 54% of non defaulters and 21% of defaulter floriculture projects were

managed by employed managers where as about 46% of non defaulters and 75% of defaulters were managed by owners. The difference between the defaulters and non defaulters with regard to type of management were statistically significant at 5% probability level (Table 8).

#### 4.1.7. Other source of income

Sales of project product are the major source of income for the borrowers to repay their loan on the bases of loan contract agreement. According to the study result, of the total floriculture growers about 57% had no other sources of income whereas about 43% of growers had other sources of income.

**Table 9. Proportion of floriculture growers by other source of income**

Other source of income	Non-defaulters		Defaulters		Total		$\chi^2$ - value
	Frequency	%	Frequency	%	Frequency	%	
No	11	42.3	20	71.4	31	57.4	4.676*
Yes	15	57.7	8	28.6	23	42.6	
Total	26	100	28	100	54	100	

\*Significant at 10% probability level

Source: Own compilation (2014)

As shown in table 9, about 42% of non defaulters and 71% of defaulters had no other source of income that supports the repayment of their loan where as about 58% of non defaulters and 29% of defaulter floriculture credit borrowers had different economic activities other than the project financed. This means flower growers engaged in different businesses that generate income had got better opportunity to repay the loan in more effective manner. The difference between the defaulters and non defaulters in terms of access to off farm income was statistically significant at 10% probability level.

## 4. 2. Institutional Factors

### 4.2.1. Loan issuing time

Loan issuing time is an important factor that affects the successful implementation of projects according to its time schedule. It has a significant impact on production and

revenue schedule of the project. This in turn affects the repayment performance of borrowers and it is the cause for a number of rescheduling of loan repayment period. Similarly the study result shows that, the average time from application to first disbursement was about 269 days with a minimum and maximum of 59 and 680 days, respectively.

**Table 10. Proportion of flower growers by loan processing time by the bank**

Time(days)	Non-defaulters		Defaulters		Total		t-value
	Frequency	%	Frequency	%	Frequency	%	
≤ 60	4	15.4	0	0.0	4	7.4	
61-100	3	11.5	0	0.0	3	5.6	5.270***
101-200	11	42.3	3	10.7	14	25.9	
>200	8	30.8	25	89.3	33	61.1	
Total	26	100	28	100	54	100	
Mean	172		358		268.78		
Std. deviation	93		156		158.714		

\*\*\*significant at 1% probability level

Source: Own compilation (2014)

The average loan processing time for the non defaulters and defaulters was about 172 days and 358 days, respectively. Similarly table 10 shows that about 87% of loans were processed in more than 100 days while 61% required more than 200 days. According to the descriptive result of Mulugeta (2010), the loan processing time for agricultural projects in DBE is on average 175 days with a minimum and maximum of 30 and 630 days respectively. This shows that the loan processing time of floriculture projects is long compared to agricultural projects in general and too long compared to average loan processing time set as standard by DBE i.e. 60 working days. This implies that DBE has to work more to meet the standard loan processing time. The mean difference between non defaulters and defaulters in terms of waiting for loan approval was statistically significant at less than 1% probability level (Table 10).

#### **4.2.2. Amount of loan**

It is defined as the amount of the loan that the bank disburses to the respective borrowers. Accordingly the study result show that, on average, the bank was disbursed birr 24,192,436 for a single floriculture credit borrower with a maximum and a minimum of birr 154,140,994 and birr 3,189,318 respectively. Group wise, on average, a non defaulter borrower's loan size was about birr 33,214,758 whereas a defaulters loan size on average was about birr 15,814,565. The mean difference between defaulters and non defaulters in terms of loan size was statistically significant at 5% probability level (t-value -2.2811).

#### **4.2.3. Equity contribution (capital)**

It is defined as the amount of equity/ capital contributed by the floriculture credit borrower to the total loan approved by the bank. Accordingly the study result show that, on average, a single floriculture credit borrower was contributed an equity of birr 14,874,834 with a maximum and a minimum of birr 204,326,434 and birr 1,366,851 respectively. Group wise, on average, a non-defaulter's equity contribution was about birr 22,429,937.86 whereas a defaulter's equity contribution on average was about birr 7,859,381. The mean difference between defaulters and non defaulters in terms of owner's equity was statistically significant at 10% probability level (t-value -1.8803).

#### **4.2.4. Number of follow ups by the bank**

The study result indicated that, on average, the bank supervised the projects eight times during the entire project life with minimum and maximum of two times and twenty one times respectively.

**Table 11. Number of follow-ups made by the bank**

Number of Follow-ups	Non-defaulters		Defaulters		Total		t-value
	Frequency	%	Frequency	%	Frequency	%	
≤ 4	0	0.0	13	46.4	13	24.1	
5-8	4	15.4	13	46.4	17	31.5	-7.57***
> 8	22	84.6	2	7.1	24	44.4	
Total	26	100	28	100	54	100	
Mean	11		5		7.89		
Std. deviation	3		2		3.922		

\*\*\*significant at 1% probability level

Source: Own computation (2014)

As shown in table 11, on average about eleven and five visits were made to non defaulters and defaulters' floriculture projects by the bank's credit officers, respectively. In addition, the result shows that about 46% of defaulters floriculture project were visited by the bank's credit officers for maximum of four times during the entire project life where as 100% of non defaulters were visited more than four times. On the other hand, the result shows that about 54% of defaulters floriculture project were visited by the bank for more than four times during the entire project life. This means those floriculture projects visited more times are likely to repay the loan. The mean difference between non defaulters and defaulters with regard to follow up were statistical significant at 1% probability level (Table 11).

### 4.3. Econometric Analysis

This sub section describes the whole process of deriving the factors that influence loan repayment performance among floriculture growers. It explains the estimation of the important factors that affects the loan repayment using binary outcome estimation method, probit model and estimates the relative importance (marginal effect) of each significant variable.

#### **4.3.1 Determinants of loan repayment among floriculture growers**

As discussed in chapter 3, the probit econometric model was selected for analyzing the factors influencing the loan repayment performance of flower growers. Prior to running the probit regression model both the continuous and discrete explanatory variables were checked for the existence of multicollinearity and the degree of association using Variance Inflation Factor (VIF) and contingency coefficients, respectively. The VIF values for continuous variables were found to be very small (much less than 10) indicating that absence of multicollinearity among the continuous explanatory variables (Appendix 1).

Similarly, contingency coefficients were computed to check the existence of multicollinarty problem among the discrete explanatory variables. When the correlation coefficient becomes high (close to 1) in absolute value, multicollinarty is present with the result that the estimated variances of both parameters get very large. The results of the computation of contingency coefficients reveal that there was no a serious problem of association among discrete explanatory variables (Appendix 2). Based on the computed results of VIF and contingency coefficients, nine explanatory variables were included in the final analysis. More specifically, five continuous and four discrete explanatory variables were used to estimate the probit model.

To determine the explanatory variables that are good predictors of the loan repayment performance among flower growers, the probit regression model was estimated using the Maximum Likelihood Estimation Method. The results of the analysis are presented in Table 12.



**Table 12. The Maximum Likelihood Estimation of probit model**

<b>Variables</b>	Estimated coefficient	Std. Error	z-statistics	p-value
Constant	-17.2962	8.461089	-2.04	0.041**
Education status	0.7477643	0.4439519	1.68	0.092*
Farm size	0.0513733	0.0412531	1.25	0.213
Amount of loan	-5.37e-08	4.35e-08	-1.24	0.216
No. of follow up	0.4101408	0.1679938	2.44	0.015**
Certification status	1.663743	0.9403766	1.77	0.077*
Technology used	1.315612	1.259961	1.04	0.296
Type of management	-1.662491	1.263278	-1.32	0.188
Farming experience	0.2595511	0.1260204	2.06	0.039**
Other source of income	-0.6652184	1.068602	-0.62	0.534
Number of observation = 54		Log likelihood = - 8.1577615		
LR chi2(9) = 58.47		Prob > chi2 = 0.000		
		Pseudo R2 = 0.7818		

\*\* & \* is significant at 5% and 10% respectively

Source: Own computation (2014)

From the results in table 12 above, a likelihood ratio (LR) statistic of 58.47 with a chi squared ( $\chi^2$ ) distribution at nine degree of freedom is significant at 1% probability level. This means that at least one of the explanatory variables in the model has a significant effect on loan repayment performance of flower growers and that the explanatory variables jointly influence flower growers ability to pay for their loans.

Out of the nine variables hypothesized to influence the loan repayment performance of floriculture growers, four were found to be statistically significant. The maximum likelihood estimates of the probit regression model shows that education level, number of supervisions/ follow-ups by the bank, sustainable floriculture certification status and farming experience of the floriculture growers were important factors determining the loan repayment performance of DBE's floriculture credit borrowers. More specifically, the coefficients of number of follow ups/supervisions by the bank and farming experience of the grower were statistically significant at 5% probability level. The variable education level and sustainable floriculture certification status of the flower growers were statistically significant at 10% probability level. On the other hand, the coefficients of five explanatory variables, namely farm size, amount of loan, other source of income, type of

management and level of technology used were less powerful in explaining loan repayment performance of DBE's floriculture credit borrowers.

The result of the probit model shows that education level of floriculture growers has significant and positive effect on ability to repay their loan. It might be because of the fact that borrowers, who have higher education level, could find better market for their products, they could be cost conscious that is economical usage of resources and they may have future investment plan working with the bank. These and other reasons make the borrowers who have a higher education status to have a good repayment performance. Increasing education level of a floriculture grower by one year has the effect of increasing the probability of a grower been able to repay the loan by 33.9%. This implies that a borrower will likely have greater loan repayment ability when he or she has a higher educational level and vice versa. This also confirms the results of Wongnaa and Awunyo (2013), Mulugeta (2010), Eze and Ibekwe (2007), Birhanu (1999) and Abrham (2002).

The Number of follow-up/supervisory visit is an important institutional factor, which is positively related to floriculture grower's ability to repay their loans and is significant at 5% probability level. Increasing the number of supervisory visits by one will increase the probability of a floriculture credit borrower been able to repay the loan by 20.2%. This means that the more credit officers visit floriculture credit borrowers to supervise how loan is used, the better borrowers repayment abilities and vice versa. In other words, this implies that floriculture credit borrowers with more accesses to technical assistance and guidance on farming activities during the visit were able to repay their loan as promised than those who had less or no visiting at all. The reason for this is that borrowers who have frequent contact with the bank's professionals are better informed about markets and production technologies as well as bank's rule and regulation on repayment of loan. This will motivate floriculture credit borrowers to work harder and there will be less probability of diverting the loans to unintended purpose. This is in line with the results of Bankhshi and Koopahi (2002), Mulugeta (2010), Wongnaa and Awunyo (2013), Jama and Kulundu (1992), Okovie (1996) and Fantahun (2000) have also reported the positive effect of this variable on loan repayment.

In addition, sustainable floriculture certification status is hypothesized to affect loan repayment positively. Similarly the result of probit estimate confirmed that floriculture growers who had been certified with a multitude of standards in the form of certification schemes, codes of practice and a handful of consumer labels have good loan repayment performance. The coefficient is positive and significant at 10% probability level. The probability of being non defaulter increases by 76.8% for certified DBE floriculture credit borrowers than those who have not. This means flower growers have more access and compete in the market if certified with sustainable floriculture certificates as a result generate more revenue. This will enable the floriculture credit borrower to repay his/her loan at the right time. The reason for this is that Nowadays; the market is characterized by the existence of a multitude of standards in the form of certification schemes, codes of practice and a handful of consumer labels. One of the reasons for this large number of co-existing certificates is the fact that retailers tend to adopt those standards which best meet their needs. There is even a strong trend among large retailers to set up their own private standards. So, although fragmented, the importance of standards in the European flower is increasing (ProVerde, 2010).

Furthermore, farming experience has a positive coefficient and it is significant at 5% probability level. Increasing floriculture farming experience by one more year increases the probability of the floriculture credit borrower been able to repay the loan by 12.5%. This means that the likelihood of the floriculture credit borrower been able to pay the loan will increase when the years of farming experience increase and vice versa. The implication is that farming experience could probably lead to proper utilization agricultural loans and inputs and this could have apposite effect on the magnitude of farm profit. Similarly as a grower gets more experience, its decision quality increases and this also has a positive impact on the sustainability of the project. Consequently, loan repayment ability would be enhanced. This also confirms the results of Oladeebo (2008), Wongnaa and Awunyo (2013) and Mulugeta (2010).

#### **4.3.2. Marginal effect of significant variable**

All significant explanatory variables do not have the same level of impact on loan repayment performance of floriculture credit borrowers. In order to determine the relative importance of each explanatory variable on repayment performance of floriculture credit

borrowers, it needs calculation of marginal effect of each significant explanatory variable and the result after the probit model estimation is presented as follows:

**Table 13. Marginal effect of significant variables**

variable	dy/dx (Marginal Effect)
Education level	0.0616548
Number of follow-up	0.033817
Certification status	0.1371792
Farming experience	0.0214005

Source: Own computation (2014)

As indicated in table 13, the marginal effect of being certified with different floriculture certification standards is about 14% that is the highest when compared to other significant explanatory variables. The percentage implies that the probability of being non defaulters increase by 14% for floriculture credit borrowers who have been certified with different floriculture certification standards, *citrus paribus*. Next to certification status of floriculture credit borrowers, education level has a significant and positive effect on repayment performance of borrowers. The probability of being non defaulters increases by 6% for floriculture credit borrowers who have higher education level *citrus paribus*. Follow-up/supervisory visits by credit officers and Farming experience takes the third and fourth important factors affecting repayment performance of floriculture credit borrowers with 3.4% and 2% respectively.

## **CHAPTER FIVE: CONCLUSION AND POLICY IMPLICATION**

### **5.1. Conclusion**

Development Bank of Ethiopia is one of the institutions which is engaged in providing financial support for development projects such as floriculture sub sectors. However, according to the data obtained from the central data base of DBE (2013), there is increasing default rate among DBE'S floriculture credit borrowers. This has an impact on the sustainable provision of credit to the potential investors and existence of the bank as a financial institution. This study therefore carried out an assessment on factors that influence loan repayment performance of DBE's floriculture credit borrowers. The study specifically identified critical factors and estimated the relative importance of factors in improving loan repayment performance among floriculture credit borrowers.

Data used for the study were collected from the fifty four actual floriculture credit borrowers of DBE using a standard format prepared for the purpose of collecting all the necessary information from the individual file with the help of a trained data collector. The study shows that 28 (52%) of the floriculture credit borrowers were defaulters, whereas the rest 26 (48%) were non defaulters.

The result shows that among nine explanatory variables, which were hypothesized to influence loan repayment performance among floriculture credit borrowers, four explanatory variables namely education level, number of follow ups/supervisory project visit by credit officers, sustainable floriculture certification status and farming experience were statistically significant while the remaining five were less powerful in explaining the variation in the dependent variable. The model result reveals that there is no contrary sign from priori hypothesized among the significant explanatory variables.

Education level is one of the factors which have positive and significant influence on loan repayment performance of floriculture credit borrowers of DBE. This implies that a grower will likely have greater loan repayment ability when he or she has a higher educational level.

The model result shows that number of follow-up/supervision has a significant positive influence on the loan repayment performance of DBE's floriculture credit borrowers. This is due to the fact that borrowers who have frequent contact with the bank's professionals are better informed about markets and production technologies as well as different information on the banks rule and regulation. As a result a borrower who has a frequent contact with bank's professional was more likely to be non defaulter.

The loan repayment among floriculture credit borrowers is also influenced by sustainable floriculture certification positively and significantly at 10% probability level. This might be due to the reason that nowadays the market is characterized by the existence of a multitude of standards in the form of certification schemes, codes of practice and a handful of consumer labels. Hence, flower growers will get more market access and able to compete in the market. Consequently, generate more revenue which enables the borrower to be able to repay the loan as per the agreement. In addition, floriculture certification has the highest relative marginal effect on loan repayment performance of floriculture credit borrowers compared to other significant explanatory variables.

Farming experience is the other important factors affecting loan repayment performance of DBE's floriculture credit borrowers positively. This is due to the fact that farming experience could probably lead to proper utilization of floricultural loans and inputs and this could have a positive effect on the magnitude of farm profit. Consequently, loan repayment ability of a borrower would be enhanced.

## **5.2. Policy Implication**

Based on the results obtained in this study, it is recommended that credit institutions or lending agencies should look out for the factors that significantly influence loan repayment before granting loans to floriculture growers to reduce loan defaults.

Routine visits by credit officers to floriculture producers will help put producers on track and monitor the proper use of the loan they acquired. Hence, the bank should take serious consideration on supervision of the project in order to provide relevant information and technical support for the success of floriculture credit borrower.

The study also recommends that all floriculture growers should be educated on the importance of being certified with a multitude of standards in the form of certification schemes, codes of practice and a handful of consumer labels so that they can adopt those standards which best meet customer needs and will get more market access as a result generate more revenue. This will help them to have a better output and hence a better repayment capacity.

In addition, it is also recommended that the bank should give focus on evaluating the relevant farming experience of the floriculture producer during know your customer (KYC) assessment due to the fact that more experienced producer probably know proper utilization of floricultural loans and inputs and this could have appositve effect on the magnitude of farm profit which enhance the timely loan repayment.

Moreover, like other significant variables the bank should focus on the education level of floriculture credit borrowers during loan application for the reason that more educated floriculture grower could find better market for their products, they could be cost conscious that is economical usage of resources and probably they could overcome problems faced. Finally, producers should be encouraged to further their education and practice factor that encourage a higher repayment rate.

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## APPENDIX

### Appendices 1. VIF of the continuous explanatory variables

Variable	Tolerance(1/VIF)	VIF
Education level	0.732	1.365
Farm size	0.349	2.864
Amount of loan	0.323	3.091
Number of follow-up	0.475	1.105
Farming experience	0.683	1.464
Mean VIF	2.18	

Source: Own computation (2014)

According to Gujarati (2003), VIF can be defined as:

$$VIF = 1/1-R^2$$

Where,  $R^2$  is the square of multi correlation coefficients that results when one explanatory variable ( $X_i$ ) is regressed against all other explanatory variables. The larger the value of VIF ( $x_i$ ) the most troublesome or collinear the variable  $X_i$  is. as a rule of thumb, if the VIF of a variable exceeds 10, there is a multicollinearity problem. The VIF values displayed above (Appendices 1) have shown that all the continuous explanatory variables have no serious multicollinearity problem.

### Appendices 2. Contingence coefficient for discrete variables

Variable	CC
Certification status	0.433
Technology used	0.514
Management type	0.284
Other sources of income	0.282

Source: Own computation (2014)

When the variables to be calculated are discrete in nature, Contingency coefficient (CC) is used. Contingency coefficients can be calculated as:

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

Where, CC= Contingency coefficient,  $\chi^2$  = Chi-square random variable and N=total sample size.

### **Appendices 3: Standard format prepared for data collection**

This format is prepared to collect data's from the files of individual floriculture credit borrowers financed by DBE to undertake my research titled '**Factors Affecting Loan Repayment Performance of Floriculture Growers: The case of DBE** '.

#### **I. Background information**

1. Name of borrower: \_\_\_\_\_
2. Educational status of borrower/Manager: \_\_\_\_\_years.
3. Nationality of the borrower:
  1. Ethiopian \_\_\_\_\_
  0. Outside Ethiopia \_\_\_\_\_
4. Altitude of the farm \_\_\_\_\_ meter
5. Farm size \_\_\_\_\_ hectare
6. Distance of the farm from international airport \_\_\_\_\_ KM
7. Number of hours to reach the international airport from the farm \_\_\_\_\_ Hrs

#### **II. Loan history**

8. Loan issuing time (*i.e.* number of days taken from loan application to first disbursement of the loan): \_\_\_\_\_
9. Loan amount disbursed: Br. \_\_\_\_\_

10. Number of follow-ups/inspections under taken by the bank after the loan disbursed: \_\_\_\_\_
11. Equity debt ratio: \_\_\_\_\_%.
12. Status of borrower repayment:
1. Non-defaulter (Not delayed its loan repayment period) \_\_\_\_\_
0. Defaulter (Delayed its loan repayment period) \_\_\_\_\_

**III. Other information**

13. Does the company/individual borrower have any sustainable floriculture certification?
1. Yes \_\_\_\_\_ 0.No \_\_\_\_\_
14. If yes what is the level of certification:
1. International certificate (GAP, MPS ABC, SQ etc.) \_\_\_\_\_
0. Otherwise, domestically awarded by EHPEA (Bronze,Silver,Gold) \_\_\_\_\_
15. The Level of technology used:
1. Advanced like greenhouse with automatic Ventilation, computerized irrigation with smart system and other advanced farming equipment's.
0. Greenhouse with manual ventilation and manual irrigation system and the like
16. Management type: 1. Owned \_\_\_\_\_ 0. Employed \_\_\_\_\_
17. Previous floriculture farming experience of the borrower/Manager: \_\_\_\_\_years
18. Does the borrower have other income source: 1. Yes \_\_\_\_\_ 0. No \_\_\_\_\_
19. Marketing strategy: 1.Direct marketing \_\_\_\_\_ 2.Auction \_\_\_\_\_ 3.Both \_\_\_\_\_
20. Problems mentioned from the borrower side and/or from the banks side as the causes of loan default?

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**THANK YOU**