MAKING MICRO-IRRIGATION SYSTEMS ACCESSIBLE THROUGH MICROFINANCE TO BASE OF THE PYRAMID FARMERS IN CENTRAL AMERICA

Master's thesis

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ABSTRACT

Micro-irrigation is essential for poor farmers in Central America, since it has the potential to double their yearly revenue by enabling them to farm during the dry season. Even though simple low-cost micro-irrigation technologies have been developed to target especially the poorest farmers, the latter are often unable to provide a lump sum payment in order to purchase such technologies. Thus, microfinance has a crucial role in enabling base of the pyramid (BOP) farmers to acquire income-generating technologies and hence in contributing to the reduction of rural poverty. Therefore, this thesis analyzes which microfinance products and conditions can be offered in order for BOP farmers to afford micro-irrigation systems in Central America.

A field study has been carried out in Nicaragua to assess the needs of BOP farmers in terms of microfinance for the acquisition of micro-irrigation systems and the supply of microfinance products for this target group. The outcomes of this study suggest several obstacles preventing BOP farmers from getting access to microfinance products in Nicaragua, such as the necessity for clients to provide collateral in order to be granted a loan, the high loan interest rates required by microfinance institutions, the scarce availability of microfinance services in rural areas as well as the lack of comprehensive solutions combining financial products with agronomic and technical advice.

Building on these shortcomings, four case studies providing innovative solutions are presented. These include a partnership for a micro-leasing agreement, a lending approach supporting the whole supply chain through strategic partnerships, the provision of microfinance together with agricultural development services, and the linkage of community-based organizations with formal financial institutions in order to reach farmers in remote areas.

Subsequently, based on these case studies, solutions are presented that target especially BOP farmers desiring to acquire a micro-irrigation system in Central America. Of particular interest are the provision of credits to micro-irrigation retailers, who offer packages to small farmers containing farming inputs, advice services and micro-irrigation systems, as well as a micro-leasing agreement between a microfinance institution, a micro-irrigation provider, and a cooperative of producers.

Finally, this thesis points out different enabling factors for such products to be widely available, such as the readiness to build partnerships with different institutions, a favorable legal framework, and the promotion of fair interest rates through financial transparency.

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1 INTRODUCTION

Alleviating rural poverty continues to represent a key challenge in Central America as it does in most developing countries. Indeed, agriculture plays an essential role in the economic development of many countries and represents a major source of opportunities to raise out of poverty a large numbers of rural persons (IFAD, 2010). However, "800 million of the 1.1 billion people in the world who earn less than a dollar a day, live in rural areas in developing countries and earn their living from farming. What global poverty eradication efforts have failed to grasp is that these 800 million people earn their living from tiny farms where conventional modern farming and irrigation tools and strategies simply don't work" (Polak, 2007). Hence, despite the fact that most poor farmers do own land, they do not use it efficiently; the lack of appropriate technologies such as micro-irrigation systems is certainly one of the main causes. Thus, the necessity arises to create simple low-cost products adapted to the poor. This is in accordance with Prahalad's view (2009) that through a collaboration between the poor, civil society organizations, governments, and firms, innovate products to help the poor escape poverty can be created: entrepreneurship, by successfully building markets at the base of the pyramid (BOP), is at the heart of the solution to eradicate poverty. Departing from this idea, the organization IDE developed low-cost drip irrigation systems and made them affordable for the poor (www.ideorg.org). However, in order to access even the cheapest technologies, poor farmers do need microfinance. Prahalad and Hart (2002) confirm that in order to reduce poverty effectively it is essential not only to increase the earning potential of the poor through adapted technologies but also to provide access to credit. An estimated 2.7 billion adults in the world, almost exclusively poor people, do not have a formal sector savings, transaction, or credit account (Ehrbeck, 2011). Indeed, BOP farmers have no access to financial services because they are required to put up acceptable collateral, which they do not possess; because the interest rates are high, due to the high costs of screening and monitoring the poor; and because the availability of such services in remote rural areas is limited.

Therefore, the objective of this thesis is to assess the microfinance needs of poor farmers desiring to acquire low-cost micro-irrigation systems, and the available offer from microfinance providers in Central America, in order to find innovative affordable microfinance instruments for BOP farmers. Hence, this thesis focuses on answering the following question: which microfinance products and conditions can be offered in order for BOP farmers to afford micro-irrigation systems in Central America. For this purpose

a field study has been carried out in Nicaragua, where small farmers and microfinance providers have been interviewed.

After a theoretical description of the life of BOP farmers in Central America, of the potential of micro-irrigation systems to improve poor farmers' revenues, as well as of the provision of rural microfinance services in Central America, this thesis assesses the microfinance needs of BOP Nicaraguan farmers who desire to acquire micro-irrigation systems, as well as the available microfinance supply for the purchase of such systems. Based on the results of this study, four case studies about innovative ways of providing microfinance services to poor farmers are presented. Last but not least, recommendations and practical implications for the implementation of innovative microfinance solutions in Central America are given based on the case studies, before the final conclusion ends the thesis. But first, key terms shall be described, as well as the frame of the thesis.

2 MICRO-IRRIGATION SYSTEMS FOR BOP FARMERS

2.1 TERMS' SPECIFICATION

The present chapter gives specifications about how the main terms of this work are to be understood. The terms Base of the Pyramid, micro-irrigation systems, microfinance and rural Central America are described below.

2.1.1 BASE OF THE PYRAMID

The term Bottom of the Pyramid (BOP) has first drawn the world's attention in 2002 as C.K. Prahalad, a distinguished Professor of Business Administration at the University of Michigan Business School Ann Arbor[1] co-published[2] the article "the Fortune at the Bottom of the Pyramid". This article was followed by another article published in Harvard Business Review the same year[3] and by his famous book "Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits" in 2004.

Concerned with the challenge of alleviating poverty, Prahalad (2009, p. 27-28) considered necessary to adopt a "better approach to help the poor, an approach that involves partnering with them to innovate and achieve sustainable win–win scenarios where the poor are actively engaged and, at the same time, the companies providing products and services to them are profitable".

[1] C.K. Prahalad is as well the chairman and founder of Praja Inc. a pioneer company in interactive event experiences based in San Diego, California.
[2] Prahalad, C.K., and S.L. Hart. 'The fortune at the bottom of the pyramid.' *Strategy + Business*, 2002.
[3] Prahalad, C.K., and A. Hammond. 'Serving the world's poor profitably.' *Harvard Business Review*, 2002.

Prahalad and Hart (2002) classify the world population into an economic pyramid consisting in four tiers[4], as illustrated in table 1, according to the distribution of wealth and the capacity to generate income. The last tier represents four billion people having a Purchasing Parity Power (PPP) of less than 1'500 dollars, the minimum considered necessary to sustain a decent life: this is the bottom of the pyramid (BOP).

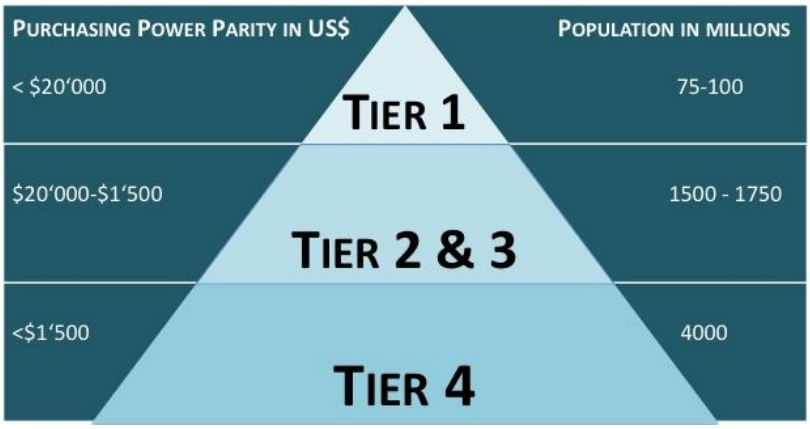

***Figure 1**: The world economic pyramid. (Source: Prahalad & Hart, 2002)*

Prahalad's main assumption (2009, p.30) is that the BOP represents a "significant untapped opportunity for value creation (for BOP consumers, shareholders, and employees) that is latent in the BOP market". He argues that contrary to what is commonly assumed, the BOP has money to spend, maybe not individually, but it has a high aggregate purchasing power and it is not merely concerned with fulfilling its basic needs. Furthermore the BOP is open to new technologies, is connected by information technologies, is brand-conscious, and mostly accessible by multinational companies (MNCs) distribution channels. All these characteristics make the BOP a major business opportunity for MNCs, because the BOP needs are unmet yet (Prahalad, 2009).

Therefore Prahalad's opinion is that multinationals should focus on the BOP market because on the one hand making it participate in the world market would help alleviate poverty, on the other hand it can as well generate significant profits for MNCs (Prahalad & Hart, 2002).

When Prahalad mentions four billion poor in the BOP market, there exist many critics arguing that this figure is exaggerated and so is the potential of the BOP market for MNCs. Indeed, Karnani (2006) argues that the poverty threshold of 1'500 dollars revenue a year chosen by Prahalad is arbitrary. The World Bank defines the extreme poverty line at 1.25 dollar a day and the moderate poverty line at two dollars a day

[4] The first article „The fortune at the bottom of the pyramid" pictures a world pyramid with four tiers whereas the book published two years later presents a world pyramid with five tiers. The original last tier was divided in persons earning $1500 per year (forth tier) and persons earning <$1500 per year (5th tier).

(www.worldbank.org/poverty). The number of persons living under 1.25 dollar is estimated at 1.4 billions for 2005, and at 2.6 billion for persons living under two dollars a day (Chen & Ravallion, 2008). However Prahalad (2009, p.7) specifies in the updated version of his book that: "The extensive study by World Resources Institute/ International Finance Corporation has given granularity to the composition of the next 4 billion by country and by income level. […]. The 4 billion people who constitute the Bottom of the Pyramid are not a monolith. For those who want to engage in this opportunity, there is no single universal definition of the Bottom of the Pyramid that can be useful. The definition must fit the focus for productive engagement."

Interesting is also the contrast that Robinson (2001) makes between the extremely poor and the economically active poor, where the latter is generally used to distinguish those among the poor who are in some way employed, who do not suffer from severe food-deficit, who are not totally destitute, and who could become creditworthy borrowers.

Since the object of this thesis is BOP farmers, it implies that they have some form of employment, namely in the agriculture, which does not mean, according to the World Bank (www.worldbank.org/poverty), that they are not extremely poor, i.e. living under 1.25 dollar a day.

Consequently, when discussing the BOP, this thesis means persons among the four billion poorest people in the world, who have some form of employment, namely in the agriculture. And this even though the richer persons of these four billion people are not universally considered as poor and some of the poorest persons of the BOP lack some form of employment and are therefore not part of the object of this thesis.

Last but not least, in current discussions Bottom of the Pyramid and Base of the Pyramid are used interchangeably. However this thesis chose the term Base of the Pyramid because it represents better the bottom-up view (Prahalad, 2009).

2.1.2 MICRO-IRRIGATION SYSTEMS

Water scarcity has become one of the major global problems. Particularly the agricultural sector has an important role to play in promoting sustainable water management since it is currently responsible for 70 percent of the worldwide water consumption (Schneeberger, 2010). What is more worrying is that the effects of water scarcity are primarily felt by the already vulnerable, the poor in developing countries. "Access to water is the key to wealth or poverty. Having enough water means prosperity, scarcity of water means poverty" (Heierli & Katz, 2007, p. 15). Water scarcity represents a significant problem in rural areas since more than 70 percent of the world's poorest

people are small-scale farmers, for most of whom access to irrigation water provides a substantial increase in food production (www.ideorg.org).

Wasteful methods of large-scale irrigation have long prevailed, however the irrigation industry has understood the challenge of sustainable water management and focuses now on water saving technologies, however it still mostly targets modern farms with high-tech solutions (Heierli & Katz, 2007). Indeed, drip irrigation is the most efficient and water-saving way to grow crops in water scarce areas, however with an investment cost of 1'000 dollars per acre[5] and being seldom available for smaller areas, poor farmers cannot afford it (IDE, 2010a).

Hence, this thesis focuses on an innovative low-cost drip micro-irrigation system developed by the social enterprise "International Development Enterprises" (IDE)[6]., illustrated in figure 2. Due to the high costs of available drip irrigation systems, IDE designed its own micro-irrigation system at affordable prices for poor farmers and available for small-plot farms.

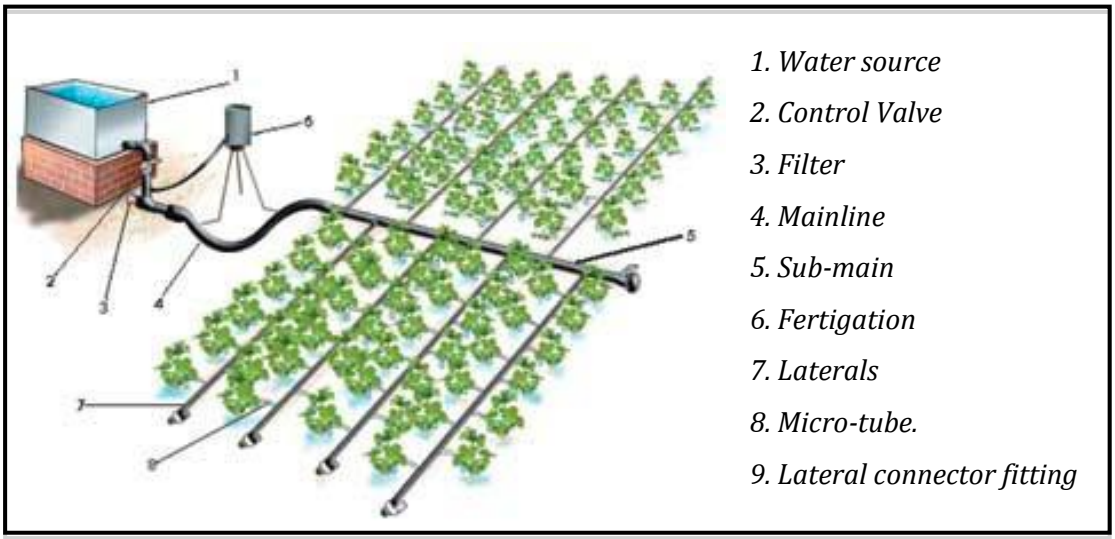

***Figure 2**: IDE's simple drip irrigation system (Source: IDE, 2010a).*

IDE has been able to reduce the cost of drip irrigation systems by replacing traditional emitters with holes and micro-tubes, by extending water distribution lines to crops, and by customizing systems for small plots, from 20 square meters up to one acre (IDE, 2010a). Drip-irrigation systems allow saving from 30 to 70 percent water, they facilitate participation in high-value vegetable markets through the delivery of fertilizers directly to roots, allowing thus cultivation during the dry season and have as well demonstrated a 30 percent yield increase over conventional irrigation methods (IDE, 2010a).

[5] 1 acre = 4046.86 *m2*

[6] IDE is a social enterprise creating income opportunities for poor rural households by providing low-cost access to water and effective markets. www.ideorg.org.

Therefore when researching how to make micro-irrigation systems accessible to BOP farmers, this thesis considers primarily IDE low-cost drip irrigation systems.

2.1.3 MICROFINANCE

There is no universally accepted definition of microfinance, however most scholars and practitioners would agree that microfinance refers to a range of financial services such as deposits, loans, payment services, money transfers, and insurance that target poor households and their microenterprises (Sharma, 2001). Microfinance targets the needs of disadvantaged households who are excluded from the formal financial system due to their lack of collateral, that is the poor and very poor (Khawari, 2004). Because the microfinance industry focus on the poor, which have varied financial needs, microfinance institutions (MFIs) often use non-traditional methodologies, such as group lending or other forms of collateral not employed by the formal financial sector (www.mixmarket.org).

Initially, microfinance exclusively consisted in its main product: microcredit, which was developed in the 1970s, when programs in Bangladesh (Grameen Bank), Latin America (ACCION International) and India (Self-Employed Women's Association Bank) started to lend to groups of poor entrepreneurs, mostly women (Helms, 2006). In the 1990s, the term "microcredit" began to be replaced by "microfinance," which includes not only credit, but also various other financial services that have been developed for the poor, such as savings, insurance or money transfers (Helms, 2006).

Microfinance services for the poor have proved to be a powerful tool to reduce poverty and vulnerability to economic stress as well as to allow them building assets and increasing incomes (www.cgap.org). However, in the last two decades, microfinance providers started being required to be financially sustainable, in order for microfinance to become a true business rather than a social project, which raised the question whether there is a trade-off for microfinance providers between financial sustainability and social objectives. This question has been extensively treated in the literature[7].

While this question is discussed in chapter 4 in the frame of an analysis of microfinance services for BOP farmers, the present paragraph aims at giving a brief introduction and explanation of the term microfinance as it is interpreted in this paper, i.e. as a range of financial services - including, but not restricted to microcredit - that targets poor households and their business.

[7] For instance, Hermes & Lensink, 2007; -Kunt & Murdoch, 2007 and 2009; Gutiérrez-Nieto, Serrano-Cinca & Mar Molinero, 2009.

2.1.4 RURAL CENTRAL AMERICA

Central America hosts slightly over 40 million people and is composed of seven different countries (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama), which present similar characteristics in terms of agricultural, socioeconomic, agro-ecological, and climatic conditions (Stads, Hartwich, Rodríguez & Enciso, 2008).

As illustrated in table 1, agriculture plays an important role in Central America. In 2008, the rural population amounted from 27 percent in Panama to 52 percent in Honduras. Correspondingly agriculture employed from 14 percent in Costa Rica, to more than 39 percent in Honduras. Despite the important role of agriculture in Central America, its productivity is low. Yields for food crops like cereals, beans, and vegetables grew very slowly: 0.5, 0.6, and 2.1 percent per year, respectively, during the period from 1980 to 2006; similarly Nicaragua's productivity for instance is only about one fifth of that of Argentina and one twentieth of that of the United States (Stads et al., 2008). Agricultural productivity in Central America is founded primarily on maize, beans, rice, and sorghum; then on export crops, like coffee, sugarcane, bananas and tobacco, as well as on roots and tubers, and finally on livestock production (Stads et al., 2008).

Table 1 also sheds light on the fact that all Central American countries have high poverty rates, from 24 percent in Costa Rica to 51 percent in Guatemala, with 46 percent in Nicaragua, according to national poverty lines. But what is more alarming is that rural poverty rates are much higher than urban poverty rates; more than double as much in Nicaragua, Honduras and Guatemala, with rates that reach 62, 70 and 72 percent.

Also, the tropical climate in Central America, where precipitations are rare during the dry season from December to April, represents an important characteristic in terms of agriculture since it limits crop-growing possibilities during that season.

Last but not least, the important role of agriculture, its low productivity, the lack of precipitations during the dry season, as well as the extremely high rural poverty rates in Central America make the introduction of low-cost drip irrigation systems in this region a high potential factor for poverty reduction. Indeed, Zbinden and Pong (2005) stress that in places and times where precipitations are insufficient, such as during the dry season in Central America, rural families need to have a better control of water resources to carry out their productive activities: low-cost drip irrigation systems represent an important tool for such an achievement.

In the next chapters, this thesis studies the accessibility of micro-irrigation systems for BOP farmers in Central America, however a particular focus is placed on Nicaragua, since the field research has been done in that country.

Countries	Share of rural population 2008	Share of agricultural land 2005-07	share of irrigated land 2005-07	Share of agricultural employment 2005-07	Agriculture share of GDP 2008	Agricultural productivity [a] 2005-07	Share of population below internat. poverty line[b] of $1.25 a day	Share of population below internat. Poverty line[b] of $2 a day	Share of population below national poverty line [c]	Share of rural population below national poverty line[c]	Share of urban population below national poverty line[c]
Nicaragua	**43%**	**44%**	**n.a.**	**29%**	**19%**	**2'334**	**16%**	**32%**	**46%**	**64%**	**29%**
Honduras	**52%**	**28%**	**n.a.**	**39%**	**14%**	**1'858**	**18%**	**30%**	**51%**	**70%**	**30%**
Costa Rica	**37%**	**54%**	**n.a.**	**14%**	**7%**	**5'132**	**<2%**	**4%**	**24%**	**29%**	**21%**
Belize											
Panama	**27%**	**30%**	**n.a.**	**15%**	**6%**	**4'011**	**10%**	**18%**	**37%**	**n.a.**	**n.a.**
El Salvador	**39%**	**76%**	**1.9%**	**19%**	**13%**	**2'404**	**6%**	**13%**	**31%**	**36%**	**28%**
Guatemala	**51%**	**41%**	**n.a.**	**33%**	**12%**	**2'719**	**12%**	**24%**	**51%**	**72%**	**28%**

***Table 1**: Selected agriculture and poverty indicators (source: World Bank, 2010).*

a) Agricultural productivity is the ratio of agricultural value added (measured in 2000, U.S. dollars), to the number of workers in agriculture. Agricultural productivity is measured by value added per unit of input. As comparison, the United States of America have a productivity of 45'015 and Argentina 11'191.
b) International poverty line: Data from 2007 for Costa Rica and El Salvador, from 2006 for Honduras, Guatemala and Panama, and from 2005 for Nicaragua
c) National poverty line: Data from 2001 for Nicaragua, 2003 for Panama , 2004 for Costa Rica and Honduras, and 2006 for El Salvador and Guatemala.

2.2 PROBLEM STATEMENT, RESEARCH QUESTION, AND STUDY AREA

2.2.1 PROBLEM STATEMENT

Most rural households in Central America depend on agriculture, but are not able to earn a reasonable standard of living from it. Enabling poor farmers to access appropriate farming technologies can be an effective way of ensuring them a sustainable livelihood. Indeed, it has been proven that drip micro-irrigation can considerably improve their lives (IDE, 2010a). However even if those systems are low-cost, most BOP farmers cannot afford a lump sum payment to acquire such a technology. Microfinance is an important tool to purchase a micro-irrigation system, however the poorest farmers often have no access to it because they are required to put up acceptable collateral, which they do not possess; because loan interest rates are high, due to the high costs of screening and monitoring the poor and enforcing their contracts; and because its availability in remote rural areas is limited. This makes lending to rural poor barely profitable, especially since MFIs are put under pressure to be financially sustainable.

2.2.2 HYPOTHESIS

I assert that by taking into account the financial means and the needs of BOP farmers in terms of microfinance as well as the feasible range of microfinance products offered by MFIs, innovative microfinance instruments and acceptable conditions can be created by sustainable MFIs in order for BOP farmers to afford micro-irrigation systems. The access to appropriate technologies shall then lead to an improved standard of living for BOP farmers and therefore a reduction of rural poverty.

2.2.3 RESEARCH QUESTION

This thesis focuses on answering the following question: Which microfinance products and conditions can be offered in order for BOP farmers to afford micro-irrigation systems in Central America. For this purpose, the following questions shall as well be examined: What are the needs of BOP farmers in terms of microfinance? What type of financial products can MFIs offer to them, to what conditions? Which innovative microfinance products can be created to fit both the needs of BOP farmers and the possibilities of MFIs? What are the external conditions for such products and conditions to be put in place?

2.2.4 IMPORTANCE OF THE STUDY

In light of the widespread rural poverty in Central America and of the land and water sources that poor farmers have at their disposal but are unable to use efficiency, the

access to simple irrigation technologies is of primordial importance for the development of the rural sector in Central America. I strongly believe that efficiently operated MFIs with products adapted to the needs of BOP farmers desiring to acquire micro-irrigation systems can immensely contribute to the reduction of rural poverty in Central America.
This thesis should lay the basis for further empirical studies on the provision of microfinance products to BOP farmers. Besides, it should be useful for microfinance providers wishing to better adapt their products to the needs of BOP farmers as well as for other organizations providing technologies to BOP farmers and seeking to cooperate with microfinance providers.

2.2.5 STUDY AREA AND LIMITATION

Even though the research question focuses on Central America, the field research has been carried out in Nicaragua. Therefore, there is a danger in making generalizations for Central America on the basis of what is discussed on Nicaragua, however generalizations are mostly made out of the literature that has been reviewed.
Furthermore, emphasis has been placed on the collection of accurate and reliable data, however there is a lack of transparency in the disclosure of price information by MFIs, which may render some information obtained during the interviews approximate.
Also, the importance of an effective and efficient microfinance system in rural areas, an enabling legal and policy framework, as well as good governance within MFIs shall not be neglected in order to make microfinance accessible to BOP farmers. Those elements are described, but are not analyzed in detail; recommendations in those areas are not part of this research but can represent the content of a further empirical research.

2.3 RESEARCH METHODOLOGY AND STRUCTURE

2.3.1 METHODOLOGY

In the theoretical part, including chapter 2, 3, and 4, secondary data sources have been carefully analyzed. They include relevant literature from books, scientific articles, records about rural poverty and microfinance, as well as organizations' websites.
The practical part, including chapter 5, 6, and 7, consists in a field research using qualitative and quantitative data as well as literature case studies. The field research has been carried out in Nicaragua, where the needs of BOP farmers and the supply of microfinance in that country have been studied. For this purpose primary data sources have been used, including interviews with key informants such as coordinators of most organizations providing microfinance in Nicaragua, i.e. banks, non-governmental organizations (NGOs) specialized in microfinance, cooperatives providing microfinance

products, unspecialized NGOs, as well as persons belonging to programs or organizations active in the microfinance environment. Also, farmers using or interested in using micro-irrigation systems have been interviewed about their needs and opinion of microfinance. For this purpose, sample individuals participating in demonstrations of micro-irrigation products have been randomly questioned. The results of these interviews are backed up by secondary data sources. The practical part includes as well four case studies; an own case study, which analyzes the introduction of a microfinance product for BOP farmers in Nicaragua, and three case studies drawn from the literature showing innovative microfinance products elsewhere in the world. The case study method is commonly used when issues cannot easily be explained by quantitative data (Juanah, 2005), which is the reason why it is adapted to analyze the microfinance needs of BOP farmers and the provision of microfinance products adapted to their needs.

2.3.2 STRUCTURE

This thesis consists in eight chapters. After the introduction in chapter 1 and the description of the thesis framework in chapter 2, this study sheds light on the life of BOP farmers in Central America, including their occupation and spending patterns, the potential of micro-irrigation systems to improve their livelihoods, and their access to such systems. Subsequently, chapter 4 gives an overview of microfinance in general and rural microfinance, followed by a description of the microfinance environment in Central America as well as of the provision of microfinance services. Chapters 3 and 4 constitute the theoretical basis on which chapters 5, 6, and 7 are built. In chapter 5, the microfinance needs of BOP Nicaraguan farmers desiring to acquire micro-irrigation systems are assessed, followed by the microfinance supply for the purchase of such systems. Subsequently chapter 6 shows four case studies about innovative ways of providing microfinance services to poor farmers. Last but not least, chapter 7 gives recommendations and practical implications based on the case studies of chapter 6 to make the supply of microfinance services meet better the needs of BOP farmers in the specific context of irrigation in Central America. Finally, chapter 8 concludes the thesis.

3 LIFE OF BOP FARMERS IN CENTRAL AMERICA

For a better understanding of the importance of microfinance for BOP farmers in Central America desiring to acquire micro-irrigation systems, it is essential to get a deeper insight on their occupation and spending patterns, on how micro-irrigation systems could

improve their standards of living, as well as on the degree of accessibility of micro-irritation systems in Central America.

3.1 OCCUPATION AND SPENDING PATTERNS

This chapter is primarily based on a study carried out by Banerjee and Duflo (2006), two professors of Economics at the Massachusetts Institute of Technology, about the economic lives of the poor in 13 countries[8]. This chapter only takes into account the four included Central American countries, which are Guatemala, Mexico, Nicaragua, and Panama. Although the study of Banerjee and Duflo focuses on the extremely poor, living under one dollar a day, they found out that the results do not considerably vary when considering the moderately poor, living under two dollars a day.

3.1.1 OCCUPATION PATTERNS

The majority of rural poor are self-employed in the agriculture. Table 2 illustrates the occupation pattern of poor rural households in the four studied Central American countries. It shows that from 55 percent of them in Nicaragua to 69 percent in Panama operate a farm (with the exception of Mexico with five percent). Many of them own land, 37 percent in Guatemala, 50 percent in Nicaragua, and 85 percent in Panama, again with the exception of Mexico, with only four percent. However, table 2 also illustrates that their parcels of land are usually very small, the median landholding being between two and three hectares in Nicaragua and Panama and only about 0.3 hectares in Guatemala, which does definitively not allow for efficiency. One of the reasons why so many poor are self-employed is that they have few skills and little capital, which renders it hard to find an employer and in turn since they have little capital and restricted access to credit, their businesses are condemned to stay extremely small (Banerjee & Duflo, 2006).

Furthermore, rural poor operating a farm often have multiple types of activities to earn a living. As shown in table 2, the portion of poor rural households who reports multiple occupations is 84 percent in Guatemala. Even though it is smaller in Nicaragua, Panama, and Mexico, between 13 and 19 percent, it is still considerable. This pattern of multiple occupations is due, among other things, to the fact that farmers who do not have irrigated land cannot farm during the winter season when the land is dry and they lack the necessary access to funds in order to irrigate their land and use it all year long (Banerjee & Duflo, 2006).

[8] Cote d'Ivoire, Guatemala, India, Indonesia, Mexico, Nicaragua, Pakistan, Panama, Papua New Guinea, Peru, South Africa, Tanzania, and Timor Leste.

As stated in Zbinden and Pong (2005), besides the limited access to technical assistance and credit, the climate with almost no precipitation from November to April, is one of the main limitations to agricultural production in small farms in Nicaragua, since producers lack the financial capacity to access irrigation systems and therefore cannot produce during the winter. Consequently, many producers are constrained to look for work outside the farm during that period, which is the reason why Nicaraguan men often go and work in Costa Rica or El Salvador during wintertime. This temporary emigration has a negative social impact on rural households, leaving women alone with children without regular income (Zbinden & Pong, 2005).

Banerjee and Duflo (2006) mention the lack of specialization as a further peculiarity of rural poor, since they do some agriculture and some work outside the farm, but none of both occupations to the point where they could afford a living, which prevents them from learning their jobs better and reduces chances of promotion. One of the reasons for this lack of specialization is the attempt of poor farmers to reduce their exposure to farming risks by working outside the farm, and to reduce their dependency on their nonagricultural jobs by keeping an agricultural occupation (Banerjee & Duflo, 2006).

Countries	Self-employed in the agriculture	Own land	Median ares of land owned	Have multiple occupation	Food as % of consumption	Alcohol & tobacco as % of consumption	Own of radio	Own a television
Guatemala	64.4%	36.7%	29	83.8%	65.9%	0.4%	58.5%	20.3%
Mexico	4.9%	4%	na	13.2%	49.6%	8.1%	n.a.	n.a.
Nicaragua	54.7%	50.4%	280	18.4%	57.3%	0.1%	59.3%	8.3%
Panama	69.1%	85.1%	300	19.2%	67.8%	n.a.	43.6%	3.3%

***Table 2**: Rural poor living under $1.08 a day in Central America. (Source: Banerjee & Duflo, 2006[9])*

3.1.2 SPENDING PATTERNS

Table 2 illustrates that among the four Central American countries studied in Banerjee and Duflo's work, food typically represents from 50 to 68 percent of consumption in poor rural households. Surprisingly, alcohol and tobacco also have an important role in the poor's spending in Mexico, where 8.1 percent of their income is spent for this purpose. However in Guatemala and Nicaragua, less than one percent of the poors' income is spend on such goods, possibly because the poor in those countries prefer other intoxicants (Banerjee & Duflo, 2006).

[9] Sources:
Guatemala: GFHS, 1995 (469 households (HH) living under $1.08 poverty line (PL) surveyed, which represents 18% of total surveyed HHs).
Mexico: MxFLS, 2002. In Rubalcava and Teruel (2004), available at http://www.radix.uia.mx/ennvih/. (959 HHs living under $1.08 PL surveyed, representing 15% of total surveyed HHs).
Nicaragua: LSMS, 2001 (333 HH living under $1.08 PL surveyed, representing 6% of total surveyed HHs).
Panama: LSMS, 1997 (123 HH living under $1.08 PL surveyed, representing 2% of total surveyed HHs).
The LSMS are available from the World Bank LSMS project page.

The tendency to own a radio or a television is also quite high by rural poor in Central America. For instance, as shown in table 2, ownership of a radio is almost 60 percent in Nicaragua and Guatemala. Similarly, ownership of a television is nearly a quarter in Guatemala, and close to half in Nicaragua. In either case, Banerjee and Duflo (2006) assert that the poor consider having a significant amount of choice, but prefer not to spend more on food, which is confirmed by the fact that most of the surveys indicate that the share spent on food is about the same for the poor and the extremely poor. To support the evidence that the poor spend in ways that reflect different priorities, Prahalad and Hammond (2002) observed that the most vulnerable spend their income on goods that are considered as luxuries even if their needs in terms of sanitation, clean running water, or better homes are unmet. They do so because they often lack legal title to land, hence, they are unlikely to improve their homes or public facilities surrounding them.

3.2 POTENTIAL OF MICRO-IRRIGATION SYSTEMS

Taking the occupation and spending patterns of BOP farmers into consideration, it is obvious that micro-irrigation systems could substantially improve their standards of living. However these systems need to be simple and low-cost so that poor producers with little education, skills and financial capacity can access them. When meeting these requirements, micro-irrigation systems have the following advantages:

First, low-cost irrigation systems enable small producers to increase their incomes. As mentioned in IDE (2010b) micro-irrigation leads to significantly higher yields in bean, tomato, potato, all kind of vegetables, and many other crops. Furthermore the possibility to grow crops in the dry season as well, allows for an additional harvest per year for many vegetables. In deed, in comparison to traditional irrigation methods, drip micro-irrigation allows for a yield increase of 30 percent (IDE, 2010a).

Second, micro-irrigation systems improve food security by reducing the dependency on the climate and by smoothing the revenue of small producers over the year. For instance, IDE (2010b) offers smaller systems for family kitchen garden for rural households to produce for their own consumption and therefore improve their food security: "The key question is to find a good balance between home-consumption and cash incomes from selling to the markets".

Third, micro-irrigation improves the access to market and the competitiveness of small producers. According to IDE (2010b), an increasing number of small producers have to produce crops when the market demands it: micro-irrigation allows selling to supermarkets or exporting high-value crops within a rigid crop schedule, which

strengthens the position of small farmers in the value chain. Also with regards to an improved access to market, Zbinden and Pong (2005) point out the possibility to produce anti-cyclically to fluctuations of market prices and to grow crops of high seasonal commercial value. Besides, the participation in high-value vegetable markets is also facilitated by the possible delivery of fertilizers directly to the roots of the plant (IDE, 2010a).

Forth, micro-irrigation is positive for the social life of rural families because it does not require finding work outside the farm during the dry season (Zbinden & Pong, 2005).

Fifth, micro-irrigation not only represents a source of economic revenue but it also improves the family diet through a higher consumption of vegetables, since it is often used with vegetables due to their shorter growing cycles (Zbinden & Pong, 2005).

Sixth, micro-irrigation improves water footprint. Indeed, water is used more efficiently since micro-irrigation systems apply water only on spots where the plant is growing. For instance the consumption of water for banana plants in Nicaragua has been reduced from half (IDE, 2010b). In general water saving from 30 to 70 percent can be reached (IDE, 2010a).

Last but not least, Zbinden and Pong (2005) mention a reduced risk of contamination of family members and of the environment through inadequate agrochemical practices since micro-irrigation systems deliver fertilizers to plants in the exact needed quantity.

In light of the above, it seems obvious that micro-irrigation has an enormous potential to improve living standards of BOP farmers and thus to reduce rural poverty. However, for this potential to be fulfilled, it is primordial that such technologies are accessible to poor rural households. This is the topic of the next subchapter.

3.3 ACCESSIBILITY OF MICRO-IRRIGATION SYSTEMS IN CENTRAL AMERICA

The two common types of irrigation technologies available in Central America are drip irrigation and irrigation by aspersion. The latter has been promoted and integrally subsidized by the state for cooperatives and big groups of producers in the early eighties in Nicaragua, however in the nineties the state retired and irrigation systems stayed exclusively in the hands of big producers (Zbinden & Pong, 2005). Although there have been various projects to facilitate the access of small producers to irrigation systems, those initiatives have never been successful: in 1990, the average costs of irrigation in Nicaragua were estimated at 3'570 dollars per hectare for public aspersion and 2'840 dollars per hectare for private systems (Zbinden & Pong, 2005). It is obvious that small producers lacked the financial capacity to acquire such technologies.

As alternative to irrigation by aspersion, drip irrigation represents a slightly cheaper

option and more importantly, it is significantly more efficient in the use of water and therefore better adapted to grow crops in water scarce areas (Heierli & Katz, 2007). However, it is rather designed for large-scale operations and its investment cost of up to 1'800 dollars per hectare still exceeds the financial capacity of small farmers (Heierli & Katz, 2007). In Nicaragua, but also in other countries such as Guatemala, Honduras, Costa Rica, Panama, and El Salvador, there exist lower-cost drip irrigation systems distributed by a couple of main retailers, however most of these systems are high-pressure systems, requiring more sophisticated installation, filters and pumps and usually cost between 850 and 1'200 dollars per 0.7 hectares (IDE, 2010b). They are therefore still out of the reach of the poorest farmers.

Since 2009, IDE has introduced low-cost drip irrigation systems targeting the poorest farmers in Nicaragua and Honduras, and plan to do so in El Salvador, Guatemala, and possibly Mexico (www.ideorg.org). The costs of such systems amount from 15 dollars for irrigation systems from 20 square meters to 650 dollars for systems of 0.7 hectares (IDE, 2010b). Even if those are clearly the lowest prices on the Central America market, most small producers earning less than one or two dollars a day are not able to provide a lump sum payment to acquire such systems. Therefore, in order to access low-cost micro-irrigation systems, they need financial help or access to microfinance.

It shall as well be noted that many rural NGOs distribute micro-irrigation technologies to poor households for free, however such strategies are unsustainable and reach only a small fraction of farmers (Heierli & Katz, 2007). Technologies need to be commonly available in local markets to be widely and sustainably accessible to smallholders, which requires an economically viable, profitable supply chain in the private sector (Heierli & Katz, 2007).

As mentioned in Prahalad and Hart (2002), in order to help the poor elevate themselves above the desperation poverty line effectively, two interventions are essential: providing access to credit and increasing the earning potential of the poor. This chapter has demonstrated that micro-irrigation systems do increase the earning potential of the poor. In the next chapter, the access to microfinance for BOP farmers in Central America shall be analyzed.

4 MICROFINANCE FOR BOP FARMERS IN CENTRAL AMERICA

4.1 MICROFINANCE: AN OVERVIEW

This subchapter aims at giving a brief overview of the objectives of microfinance, the assumptions that lie behind the concept of microfinance, as well as the evolution of those elements over the last forty years.

4.1.1 OBJECTIVE: POVERTY ALLEVIATION

The birth of microfinance has been triggered by the objective of alleviating poverty in developing countries. Two microfinance pioneers confirm this statement. Accion International's objective is to address the desperate poverty in Latin America's cities and to give people "the financial tools they need to work their way out of poverty" (www.accion.org). Similarly the main goal of Grameen Bank in Bangladesh has been to "reverse the age-old vicious circle of 'low income, low saving & low investment', into virtuous circle of 'low income, injection of credit, investment, more income, more savings, more investment, more income' (www.grameen-info.org). Also, key international organizations such as the World Bank have adopted microcredit as a targeted approach to poverty reduction since the 1980s and gave such approaches strong emphasis in the 1990s (Weber, 2004).

Whether microfinance programs have truly achieved their purpose and had an impact on poverty needs to be given some attention. As suggested by Rosenberg (2010), even if until recently, most of the studies on poverty impact conclude that microcredit brought forth important economic and social benefits, there has been controversy about the validity of these studies, hence, it is not yet clear whether microfinance really helps raising people out of poverty.

In addition to the issue of poverty impact on clients, a critical element for microfinance to have a real impact on general poverty is its access by disadvantaged population groups; its outreach. According to Helms (2006), even if it is obvious that microfinance cannot solve all the problems caused by poverty, its potential to lift people out of poverty is immense, but much remains to be done to extend access to all who need it.

4.1.2 PARADIGM SHIFT

Starting after World War II, rural finance was supply-led; it was supplied in advance of the demand for it, which led to widespread government and donor subsidized credit programs aiming at the economic development, targeting particularly the agriculture in developing countries: this was "the old paradigm" (Robinson, 2001). However, those

extensive subsidized credit programs caused major problems: as loans were subsidized and therefore rationed, lower-income farmers were disadvantaged relative to better-off, repayment was low, and losses high (Robinson, 2001). From the eighties on, Washington-based policymakers began arguing that MFIs should be profitable: they should raise interest rates, because poor households can pay high rates since they often turn to moneylenders charging interest rates over 100 percent per year, and they should use subsidies sparingly, because those are the main cause of the inefficiency of state banks, because they weaken incentives for innovation and cost-cutting, and because they are not available in the quantities necessary to sustain the microfinance sector (-Kunt & Murdoch, 2009).

Hence, the new paradigm places emphasis on building sustainable financial institutions and systems; it departs from the demand, that is the willingness and ability to pay market prices for microfinance by farmers, and focuses on technological and institutional innovations to reduce risks and transaction costs (Zeller, 2003). Therefore, the promise of microfinance has become not only to reduce poverty but also to create sustainable microfinance institutions (-Kunt & Murdoch, 2009).

4.1.3 TRIANGLE OF MICROFINANCE: IMPACT, OUTREACH, AND FINANCIAL SUSTAINABILITY

Taking into account the described paradigm shift in microfinance, the conceptual framework of "the triangle of microfinance[10]", has been developed, bringing together three overarching microfinance policy objectives: impact: having effect on clients' quality of life, outreach: reaching the poor in terms of numbers and depth of poverty, and financial sustainability: meeting operating and financial costs over the long term (Zeller & Meyer, 2002). The triangle of microfinance is illustrated in figure 3.

These objectives are not necessarily incompatible, the most successful microfinance innovations are those able to improve impact, outreach and sustainability, but there are situations in which a tradeoff appears (Zeller & Meyer, 2002). Indeed, it seems logical that poorer clients are granted smaller loans, implying smaller and more numerous transactions, which is more expensive to manage for MFIs and limit their ability to be financially sustainable. However, some institutions reach the poorest persons, have a wide clientele base, and are profitable. For instance, out of 139 profitable institutions reporting data for 2003 to the MicroBanking Bulletin[11], 41 target the poorest clients and

[10] Concept introduced by Zeller and Meyer (2002) as the analytic core of the microfinance challenge

[11] The MicroBanking Bulletin (MBB) is published by the Microfinance Information Exchange (MIX) and is the premier benchmarking source for the microfinance industry. It publishes financial and portfolio data, which is provided voluntarily by MFIs and organized by peer groups. www.themix.org/microbanking-bulletin/microbanking-bulletin

the same 41 MFIs reach over three times more customers and achieve a better average profitability than the 139 sustainable institutions combined (Helms, 2006). Also, a further analysis of a MIX Market dataset reveals no significant relationship between loan size and the profitability of MFIs, which brings evidence that very poor people are not necessarily a less profitable group than moderate poor people (Helms, 2006). Similarly, Gutiérrez-Nieto, Serrano-Cinca, and Mar Molinero (2009) have observed, with one exception, that no MFI is socially efficient but financially inefficient, which is in accordance with the assumption that MFIs need to be financially sustainable in order to meet their social responsibilities. Finally, Rhyne (1998, p.7) states that "poverty and sustainability [are] the yin and yang of microfinance. They are two sides of a whole, each incomplete without the other. This view emphasizes that reaching the poor and sustainability are in large measure complementary, and particularly that sustainability serves outreach".

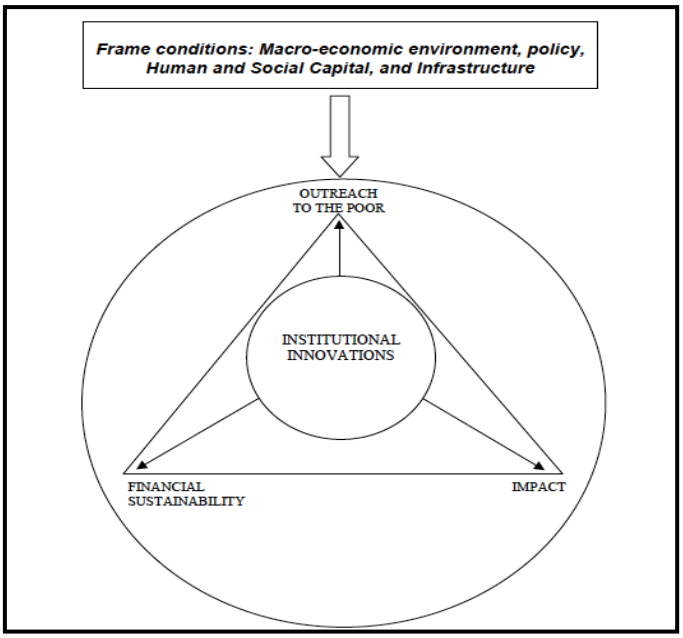

***Figure 3**: Triangle of microfinance (Source: Zeller and Meyer, 2002).*

4.2 RURAL AND AGRICULTURAL MICROFINANCE

Whereas agricultural microfinance focuses exclusively on microfinance services for the agriculture, rural microfinance refers to the provision of financial services to a rural, farm and non-farm population through various formal, informal, and semiformal institutional arrangements and diverse types of products and services, such as loans, deposits, insurance, and remittances (Nagarajan & Meyer, 2005).

Rural and agricultural microfinance have similar characteristics that render the provision of financial services more difficult than in urban areas, which is the reason why

microfinance services are scarcer in rural areas and more costly for MFIs. Those characteristics, extensively described in Zeller (2003), are summarized below:

First, the lower population density in rural areas and the significant spatial dispersion of rural households and institutions increase transaction costs for MFIs and their clients. Nagarajan and Meyer (2005) also confirm that rural financial markets are highly segmented with each MFI serving a small market niche, because high information and transaction costs impede competition and prevent it from rapidly expanding to new areas. Moreover, in sparsely populated areas, group members have less information about each other, which increases the costs of peer monitoring.

Second, the lower level of infrastructure, of access to information, education, and business training because of greater distances also raises transaction costs.

Third, a further characteristic mentioned in Nagarajan and Meyer (2005) is that rural customers often need relatively small credit and savings accounts, which as well increases transaction costs for MFIs.

Forth, there is a lower risk-bearing ability and higher vulnerability of rural poor due to the higher incidence and depth of poverty. Demand for micro-insurance, precautionary savings services or credit for consumption smoothing increases, while demand for income-generating credits tends to fall.

Fifth, the high seasonality of rural activities caused by the weather dependence leads to irregular cash incomes. Agricultural production centers on sawing and harvest time, creating cash surpluses after the harvest and cash scarcity before the harvest. Also food prices vary strongly depending on harvest time because markets are poorly integrated.

Sixth, there are higher systemic risks as well as lower and more volatile cash flows due to a great exposure to weather risk such as droughts and floods and due to a lower degree of income diversification. Moreover many non-farm activities are linked to farm activities, which creates covariance in incomes.

Seventh, there exist a high price volatility in agricultural commodities, such as sugar, coffee, and cocoa. This systemic price risk is nearly impossible to deal with by rural MFIs and creates great fluctuations of prices (i.e. Nicaragua's dependence on coffee).

Eighth, the complex heterogeneous legal framework renders the enforcement of formal laws more costly and time-consuming. Conventional collateral, such as titled land is much scarcer. Informal laws, norms, and institutions become more prevalent, which adds to the complexity of doing financial business.

Ninth, government commitment is lower in rural areas that are far away from politicians and bureaucrats' social circles, from voting ballot or from political lobbying networks.

And finally, there is a lower commitment of development organizations to rural areas

because cities or rural centers dispose about better living conditions. Community-level investments usually cluster along roads that are passable by four-wheel drive vehicles.

4.3 MICROFINANCE ENVIRONMENT IN CENTRAL AMERICA

The microfinance environment in Central America can be analyzed on the basis of a model developed by the Economist Intelligence Unit. This model assesses the microfinance environment in Latin America and the Caribbean according to three categories: investment climate, regulatory framework, and institutional development (Economist Intelligence Unit, 2008). The results of the Economist Intelligence Unit's paper are summarized below for the seven following Central American countries: El Salvador, scoring 59 over 100[12], Nicaragua, scoring 58, Guatemala, scoring 54, Panama and Mexico, both scoring 47.5, Honduras, scoring 47.1, and Costa Rica, scoring 40.3.

4.3.1 INVESTMENT CLIMATE

This category includes criteria such as political stability, capital market stability, judicial system, accounting and governance standards, and MFI transparency. In this category, Costa Rica, Mexico and Panama are faring extremely well. These three countries have a stable political climate supporting a legal and regulatory environment that is favorable to business, and the risk of systemic banking crisis is small. Their accounting and governance standards are good, though not excellent. Accounting norms among regulated institutions approximate international standards. There is, however, great unevenness in the accounting and governance practices of NGOs and cooperatives. The latter, despite having their own governance structure, lack strong external oversight. MFI transparency is reasonably good.

In El Salvador, accounting standards are also moving towards international levels, though there is no significant improvement in MFI transparency or governance quality.

In El Salvador, Guatemala, and Nicaragua, the judicial system is particularly weak. It is inefficient and highly politicized, which means that contractual agreements are often not respected and the protection of property rights is limited. In Nicaragua and Guatemala, capital markets are barely developed and the Nicaraguan financial system has suffered a number of bank collapses over the past few years, after which the Banking Superintendency has pushed banks to adopt US best-practice accounting rules.

Finally, Honduras scores the lowest in this category for its unstable political

[12] The scores are aggregated to produce an overall scoring range of 0 – 100, where 100 is the best. Overall scores and rankings were calculated by attributing a 40% weight to the regulatory framework and the institutional development category scores, and a 20% weight to the investment climate category score.

environment, weak judiciary and underdeveloped capital markets. Although its governance standards are moderately strong and transparent at banks, they are weak at cooperatives and NGOs.

4.3.2 REGULATORY FRAMEWORK

This category includes regulation of microcredit operations, formation and operation of regulated and non-regulated specialized MFIs, and regulatory and examination capacity. All countries are scoring equally well except Honduras, and finally Costa Rica, which is performing particularly badly.

In Honduras, regulated institutions were created in 2001 as specialized microfinance vehicles, particularly intended for upscaling NGOs. However, they are not attractive because they cannot hold savings from the public and face interest rate caps. There is still no clear definition of microfinance and upgrading options are complicated. Also Costa Rica's facilitation of the formation and operation of regulated MFIs is bad. There is little knowledge about microfinance and no clear legal definition. Specialized regulated MFIs are nearly non-existent and upgrading is administratively and legally difficult.

However, in El Salvador and Guatemala, the formation and regulation of non-regulated MFIs has been strong. NGOs face no major legal or regulatory restrictions. In Panama banking supervision and financial regulation are strong, but the superintendency lacks understanding of microcredit, and there is no specific definition or legal infrastructure.

In Nicaragua, NGOs also face no significant obstacle in forming and operating MFIs, though they have unsuccessfully sought legislation that would enable them to mobilize savings and become regulated financial entities. Financial regulation and supervision has improved, however, regulators lack specialized microfinance capacity and expertise.

4.3.3 INSTITUTIONAL DEVELOPMENT

Finally, the institutional development category includes the range of MFI services, credit bureaus, and level of competition. El Salvador and Nicaragua are performing well, whereas Panama, Mexico, and Costa Rica are at the bottom of the list.

In El Salvador, Honduras and Guatemala, the market hosts many players, with no single provider dominating. However the range of MFI services in El Salvador and Honduras could be expanded. Some regulated institutions have a wide variety of services such as savings, insurance and fund transfer, but NGOs generally offer only microcredit.

In Nicaragua competition is as well high and a wide range of MFI services is available. There are many small NGOs and some larger ones. The small vibrant NGO segment offers services beyond microcredit, such as funds transfer, insurance and voluntary savings.

Credit unions take deposits and make loans, but only for their members.
In Mexico, Costa Rica, and Panama, competition is low and market concentration is high. Finally in Panama, remittances and fund transfers are growing and insurance starts to expand. However although NGOs may operate in microfinance and are tax-exempt, few microfinance NGOs do actually exist.

4.4 PROVISION OF RURAL MICROFINANCE SERVICES

Taking into consideration the described limitations in offering microfinance services in rural areas as well as the microfinance environment in Central America, this subchapter describes the different types of microfinance providers present in this region, and subsequently the various microfinance products available to BOP farmers.

4.4.1 MICROFINANCE PROVIDERS

Microfinance products and services can be delivered to the poor through various providers incorporated under the umbrella concept of microfinance institutions (MFIs).
According to the definition of CGAP (www.cgap.org), an MFI is an organization providing financial services to the poor and vulnerable, including a wide range of providers that vary in their legal structure, mission, and methodology. MFIs include formal providers such as those subject to specific banking regulation and supervision (development or commercial banks), semiformal providers that are registered and subject to commercial laws but are not under bank regulation and supervision (financial NGOs, credit unions and cooperatives) or informal providers that are non-registered groups (rotating savings and credit associations or self-help groups) (www.cgap.org).

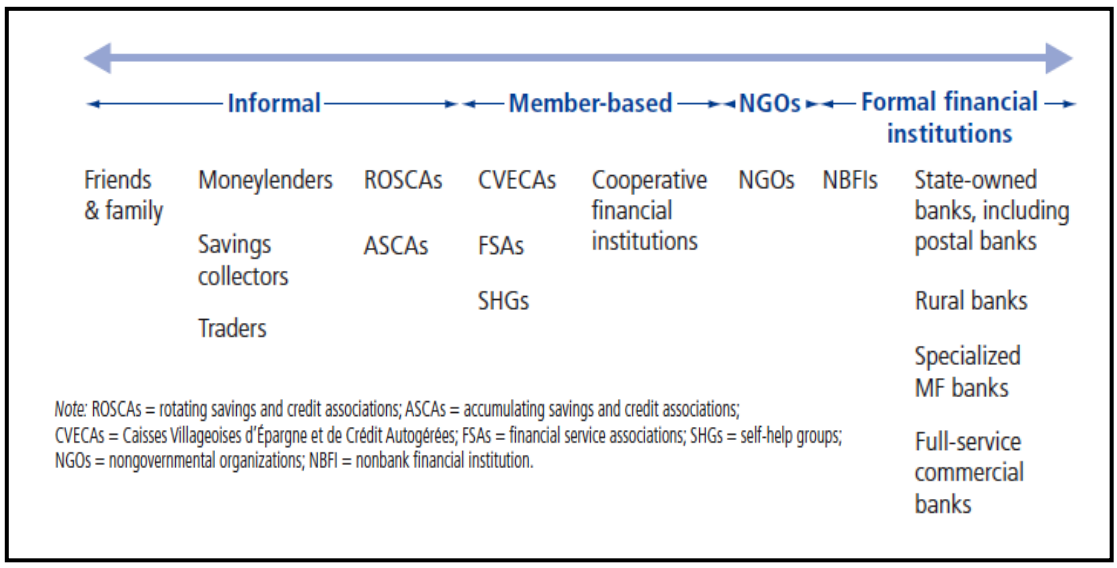

***Figure 4**: Types of microfinance services providers (Source: Helms, 2006).*

4.4.1.1 Formal financial institutions - banks

Formal financial institutions include private commercial banks and government-owned banks. The latter were often founded with social or development objectives to serve the poor and unbanked in rural areas, however they often suffer from weak loan collection, dependence on large subsidies from public funding, political domination, and a lack of responsiveness to the demand of the poor (Helms, 2006).

As regards private commercial banks[13], they are usually not committed to serving the poor, but start entering the microfinance business (Helms, 2006). They may lend indirectly through linkage programs with NGOs, where they rely on the NGO for client evaluation, monitoring, and loan recovery, or they may practice direct lending through products and services for low-income clients, through a downscaling process, implying the creation of a specialized microcredit department in the bank (Klein, Meyer, Hannig, Burnett & Fiebig, 1999).

Banks traditionally lack the right organizational structure, methodologies, effective processes, and human resources to execute small transactions for poor people, but despite these obstacles, they have a great potential to make financial systems truly inclusive and reach a large number of people through their wide networks, their large range of services, and their available funds to invest in systems and technical skills (Helms, 2006).

4.4.1.2 NGOs

NGOs appeared in the microfinance environment to make up for the failure of banks to serve poor people effectively (Helms, 2006) and have thus a clear commitment to work with the poor (Klein et al., 1999). Some NGOs devote themselves almost exclusively to microfinance, whereas others offer it in addition to other services.

Specialized microfinance NGOs have had a crucial role in the development of suitable structures and innovative microcredit technologies (Klein et al., 1999), however the majority of NGOs present several weaknesses. They are often donor dependent, their governance structures are inappropriate to bear fiduciary duty since board members are not shareholders with money at stake, they often serve a restricted number or clients, and finally, the range of financial services they can offer is limited since they are excluded from the formal banking regulation and supervision system, for instance they usually cannot mobilize savings (Helms, 2006). These restrictions have recently motivated some

[13] Private commercial banks also include rural banks, non-bank financial institutions (mortgage lenders, leasing companies, consumer credit companies, insurance companies,…) and specialized microfinance banks (Helms, 2006). However the focus here is placed on mainstream commercial banks.

NGOs to become financially sustainable in order to be independent from unpredictable donor funds and reach more poor people (Helms, 2006) and even to turn into regulated financial institutions, i.e. to upgrade, so as to be able to expand their services and to access financial markets for additional resources (Klein et al., 1999).
Also Helms (2006) notes that whereas some microfinance NGOs commercialize, others try to serve poorer and more remote customers or high-risk groups, which does not inevitably conflict with sustainability, but may take longer to reach it.

4.4.1.3 Member-Based Organizations (MBOs)

There exist different types of MBOs, which all share the common characteristic that members have the responsibility for owning, managing and operating the financial institutions, and are the main or only clients (Nagarajan & Meyer, 2005). Many MBOs operate outside the formal financial system, some are linked to it, and others are regulated and supervised by specialized authorities (Nagarajan & Meyer, 2005).
The most common types of MBOs in Central America are savings and credit cooperatives (SACCOs) and Credit Unions. They usually require membership fees, share capital, and/or obligatory savings from all members (Nagarajan & Meyer, 2005). They provide financial services such as savings, checking accounts, loans, insurance, as well as fund transfer services. Many cooperatives are grouped into federations, which offer supervision, liquidity management, refinancing, and/or technical support (Helms, 2006). Some cooperatives of producers also grant credit to their members in rural areas. Those are usually regulated by a directorate of cooperatives (Nagarajan & Meyer, 2005).
Credit unions and cooperatives face significant challenges, such as the limitation in outreach and growth potential due to the fact that financial services are restricted to members, the potential lack of funds to grant required loan, since funds are usually limited to member savings, the lack of professional management and technical skills, as well as cronyism among members (Klein et al., 1999). Furthermore, Helms (2006) outlines the need to improve their supervision and regulation.
In addition to SACCOs and credit unions, village banks are a further important type of MBOs described by Zeller (2003). These semi-formal institutions (30-50 members) usually target women and are promoted by international NGOs with the ultimate goal of reducing poverty. Village banks serve a poorer clientele and are less complex in structure and administration than credit unions, which allows less educated members to manage it. However their sustainability and outreach depend on their ability to integrate into the formal financial system (Zeller, 2003).
Finally, Self-Help Groups (SHGs) are another type of MBO worth mentioning. Their

particularity consists in trying to link savers groups with sources of finance, such as NGOs and banks (Helms, 2006). However SHGs are not given further attention in this work as they are almost exclusively found in India.

4.4.1.4 Informal lenders

Poor rural households can usually turn to various sources of informal lenders. A common informal type of micro-lenders are moneylenders. They offer valued financial services due to their knowledge of the credit market, their personal relationships with clients, their methods of evaluating the borrowers as well as their quick and easy credit procedures in convenient locations, however, they can be very expensive, until 20 percent daily (Helms, 2006).

A further alternative of informal lending are associations. Rotating savings and credit associations (ROSCAs) and accumulating savings and credit associations (ASCAs) are described by Helms (2006). In these associations, participants make regular contributions to a central "pot", which is either given to each contributor in rotation, or which grows over time as some members borrow and some do not. These associations are efficient, transparent, cost little to run, and are easy to understand.

In agriculturally dependent areas, traders, processors, and input suppliers are as well an essential credit source for small producers (Helms, 2006). Buyers and suppliers link credits to the provision of other services, such as input supply and product purchase, and can provide as well non-financial services such as technical advice and marketing facilities, which helps deal with the problems of asymmetric information and high operating costs connected with agricultural lending (Nagarajan & Meyer, 2005). Clients' loans, which might be in cash or in kind, are repaid by the farmers selling their crops at discount or having the loan deducted from their harvest proceeds (Helms, 2006).

Informal services have serious shortcomings. They can be expensive, rigid and risky, and costs can be unclear as in the case of some trader credit systems (Helms, 2006).

4.4.2 MICROFINANCE PRODUCTS

In order for BOP farmers to acquire micro-irrigation systems, several financial products are available. Microcredit is the most common of them. This subchapter differentiates between individual and group microcredit. Over the last few years, many innovative microcredit products have been introduced, such as loans for house improvements, emergencies, and consumption (Helms, 2006). However the focus is placed here on income-generating credit, as the target group of this work are farmers desiring to acquire irrigation systems in order to increase their revenues. Subsequently, further

microfinance products are described such as leasing, savings, and crop micro-insurance.

a. Individual microcredit

A microcredit is typically small and made for a short period of time at interest rates higher than banks usually charge (Nagarajan & Meyer, 2005). Indeed, the process of collecting detailed information on potential customers as well as assessing their individual repayment capacity and willingness is costly (Klein et al., 1999). Also, in order to closely monitor clients, MFIs typically collect small frequent installments, except for the agriculture, where MFIs realized that flexible loan repayment schemes are necessary because cash incomes depend on harvest (Helms, 2006).

A further microcredit characteristic is the use of collateral substitutes, as poor clients do usually not possess traditional collateral, which is the reason why they are excluded from formal credit sources (Helms, 2006). Nontraditional forms of collateral may include, co-signers, household goods and other proxies (Klein et al., 1999).

Last but not least, microcredit has the particularity to create incentives for clients to maintain good repayment rates by rewarding them with repeat higher loans, sometimes according to a predetermined formula (Nagarajan & Meyer, 2005).

4.4.2.1 Group Lending

Group lending is based on the collective responsibility of group members to repay their credit, which allows MFIs to reach more poor people at relatively low cost (Klein et al., 1999), and which also helps overcome the obstacle of lacking collateral, as the latter is replaced by group-based joint liability schemes. Early microcredit was based on solidarity group lending as by Grameen Bank or ACCION (Helms, 2006).

There are two modalities of group lending: a micro-lender may lend to a cooperative or a village bank, which in turn lends the funds to its members, in this case, only one loan is granted; or more frequently group lending - also called joint liability or solidarity group lending - means that loans are provided to individuals organized in groups (Klein et al., 1999).

Although group lending allows reaching more poor people by reducing loan administration costs and lender costs through the use of insider information and peer borrower screening, the costs of group formation and maintenance are often high, especially for lenders who do not work with existing groups and when members' needs diverge over time (Klein et al., 1999). Also borrower risk is greater since every group member bears his own risk and that of all other group members, which means that if one member defaults, the whole group does so. Finally group-lending terms are more rigid

since each member is supposed to receive and repay its loan in the same cycle (Klein et al., 1999).

4.4.2.2 Leasing

"Leasing is a contract between two parties, where the party that owns an asset (the lessor) lets the other party (the lessee) use the asset for a predetermined time in exchange for periodic payments. Leasing separates use of an asset from ownership of that asset. Lease payments amortize the asset price. […] At the end of the lease period, the lessee can purchase the asset for a token price. […] Because of the option to purchase the asset and the risks transferred to the lessee, a financial lease is a close substitute for a loan" (Nair, 2010).

Leasing offers several advantages: it often requires no collateral and lower down payments than the equity required for loans, thus it is more affordable for enterprises with limited funds and access to credit (Nair, 2010). Furthermore, transaction costs for leasing are lower than those of collateral-based loans, because developing and enforcing loan contracts in rural areas where asset registries and judicial systems for contract enforcement are poorly developed is expensive (Nagarajan & Meyer, 2005), and since leasing does not require collateral, and the primary contract security is the leased equipment, asset registry is not necessary and enforcing contract is less burdensome.

However, as reported by Nair (2010), most developing countries lack a legal framework for leasing: clear definitions of a lease contract, leased assets, as well as responsibilities and rights of the contract parties are absent. Also, organizations also need better-trained staff and institutional-level support in the form of capital and technical assistance.

Due to these obstacles, leasing is not yet common in rural areas of developing countries. However some organizations have succeeded in providing leasing products to rural poor. According to Nair et al. (2004, in Nagarajan & Meyer, 2005) Grameen Bank is the largest provider of leases to rural microenterprises, with a lease portfolio valued at 22 million dollars and a lease average size of 364 dollars: Grameen Bank reported no repayment problems on its leasing portfolio.

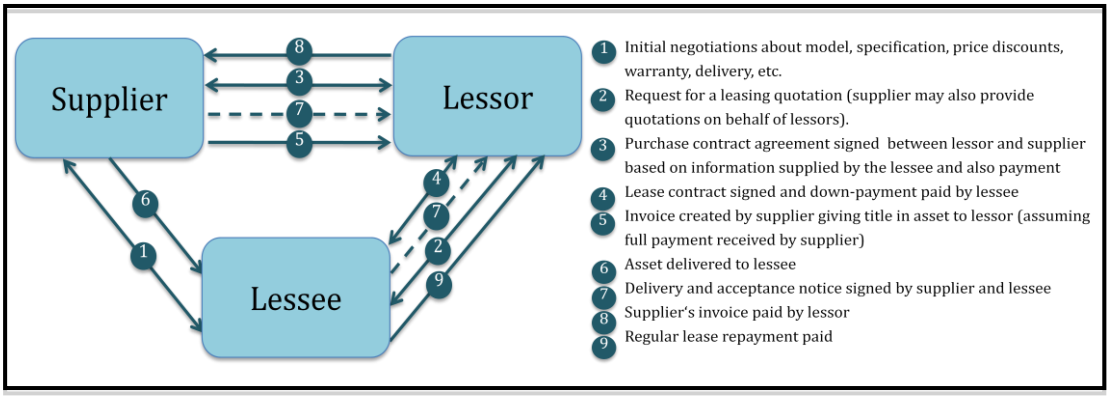

***Figure 5**: Leasing contract (Source: IFC, 2009, in Nair, 2010).*

4.4.2.3 Savings

Poor people want to save and do so, but they are constrained on the one hand by their low incomes and on the other hand by a lack of available deposit services. Often considered as the "forgotten half" of microfinance, saving is a critical microfinance service, on which few resources have been spent to make it suitable for poor people (Helms, 2006).

However savings are essential for agricultural households to survive the period between harvests and to meet contingency expenditures, they can be spent on conserving seeds, purchasing new farm inputs, storing crops, and/or selling off later in the season at higher market prices (Klein et al., 1999). Hence saving often fulfills the same function as a loan, without involving the high costs usually associated with microcredit.

Appropriate deposit services for the poor are scarce, especially in rural areas, which induces poor people to save informally, by hiding cash under mattresses, buying animals or jewelry that can be sold off later, or joining village savings circles, yet these methods are illiquid and risky, as cash can be stolen or animals can get sick (Helms, 2006).

The reason for the scarce availability of deposit services for the poor can be seen in the facts that on the one hand many banks consider the costs of managing many small accounts and transactions as extremely high (Helms, 2006), and on the other hand that laws in many countries prevent non-regulated NGOs from capturing savings, even if some do so by using compulsory savings in granting credits (Nagarajan & Meyer, 2005).

An important exception is Grameen Bank, which recently introduced popular deposit services responding to clients' need for longer-term savings: for a 10-year term, Grameen pays 12 percent interest per year (Helms, 2006).

4.4.2.4 Micro-insurance

Micro-insurance is still at the experimental stage. It can be defined as: "the protection of

low-income people against specific perils in exchange for regular monetary payments (premiums) proportionate to the likelihood and cost of the risk involved"(Helms, 2006, p.27). There exist several types of micro-insurance, such as credit life, personal accident, property insurance, agriculture or health insurance. However this subchapter focuses on agriculture or crop insurance, as it especially targets BOP farmers.

As reported in Wiedmaier-Pfisterand and Klein (2010), micro-insurance pricing is complex in rural areas because rural poor have a weak financial capability due to lower education levels and because they rely on seasonal low incomes and can hardly afford insurance. Also demand is barely known or understood, systems are inappropriate for many small transactions, risk assessment is difficult because data are lacking, and it difficult to reach scale because of distances. These factors make underwriting expensive.

Two types of agriculture insurance for low-income farmers can be identified: the traditional yield-based insurance and the weather-based insurance.

The yield-based approach described in Nagarajan and Meyer (2005) is based on on-farm assessments and the determination of real yield losses to define payouts to clients, which are measured through field inspections and on-site visits. This method requires skilled staff, extensive information systems, and statistical modeling, which are hard to obtain in developing countries. Therefore, many crop-insurance programs have failed. Furthermore yield-based insurance contains a higher probability of farmers losing their crops due to moral hazard.

The weather-based or index-based crop insurance links insurance to rainfall and other weather conditions. In order to evaluate the damage that has arisen, it uses a weather-based index as a proxy measurement of losses, which eliminates moral hazard, reduces administrative costs associated with monitoring and making claim adjustments, and renders it easier for farmers to understand (Nagarajan & Meyer, 2005). It is thus more measurable, objective, and viable, which is the reason why MFIs are considering ways to establish linkages with insurance agencies to provide such products (Helms, 2006).

This chapter has made clear that there exist various microfinance products for BOP farmers offered by diverse microfinance providers. However, several challenges may render those products inappropriate or poorly available for poor producers, such as for example high loan interest rates, high loan processing and monitoring costs for providers, scarcely available deposit services, as well as lacking institutional capacity for leasing or crop micro-insurance products.

The next chapters study the availability and suitability of these products to BOP farmers through a field study assessing the needs of poor producers and the supply of

microfinance products in Nicaragua. Subsequently, potential solutions are presented with the help of case studies in order to improve the impact, outreach and/or sustainability of microfinance for BOP farmers.

5 THE NICARAGUA CASE: MICROFINANCE FOR BOP FARMERS

Based on the life of BOP farmers and on the provision of microfinance described in the past chapters, a study has been carried out in Nicaragua to assess the needs of small producers in terms of financing for the acquisition of low-cost micro-irrigation systems, and the microfinance supply for this target group. The following chapter is based on the results of interviews conducted with farmers and with microfinance providers in Nicaragua[14], as well as on a study carried out by FIDEG[15] about the beneficiaries of microcredit by MFIs associated to ASOMIF[16].

5.1 FARMERS' NEEDS IN TERMS OF FINANCING FOR LOW-COST IRRIGATION SYSTEMS

The nine interviewed farmers own between a quarter manzana[17] (1750m2) and 5 manzanas (35'000m2) of land and grow vegetable, beans, and/or corn. However most do not cultivate their entire land due to a lack of inputs. They all showed interest in low-cost micro-irrigation systems and none of them could afford it without financial help. Most would irrigate first a small part of their land and were therefore interested in irrigation systems from 100 square meters to one manzana, which have a market value from 45 to 650 dollars: this is the loan amount they would request.

With regards to experience with microfinance, only two out of nine small producers had already been granted a loan. One farmers had a positive experience, the other a negative one, where he has not been able to pay back the loan due to exorbitant interest rates.

The producers that had never made use of microfinance gave the following explanations for not having turned to financial services:

- They did not know about the possibility to ask for a microcredit
- They had no access to microfinance because:
    - They do not fulfill the requirements in terms of collateral
    - They are living in remote areas where no MFI is present
    - The few present MFIs in the rural sector require too high interest rates.

[14] The questionnaires used for the interviews are found in Appendix A and the report of the field study in Nicaragua is found in Appendix B.

[15] International foundation for the global economic challenge. It focuses on encouraging the development of the Nicaraguan society. www.fideg.org

[16] Nicaraguan association of microfinance institutions. It counts most Nicaraguan MFIs as members. It aims to create a greater capacity for the financial and administrative management of the microfinance industry.

[17] A manzana is a unit of land area used in Nicaragua. One manzana equals 7000 square meters.

Farmers identified microfinance services as crucial for poor producers, however they declared that such services are not adapted to poor people like them.

Regarding interest rates, only two farmers have an opinion about what is an affordable rate. One mentioned that two percent per month is a reasonable rate, while the other, a cooperative's head, declared that 30 percent is the highest annual rate that cooperative's members could pay. Both pretend that such rates do not exist in rural areas.

Therefore, even though many studies affirm that poor households are ready to pay the costs that enable MFIs to be financially sustainable (Robinson, 2001), or that what poor people want is access to credit, not to "cheap" credit, which allows programs to charge high interest rates without implying a tradeoff with outreach (Murdoch, 2000), this trend has not been fully confirmed in the interviews. However most farmers mentioned that interest rates are too high without being able to give an estimation of a reasonable rate. This is consistent with the fact that the poorest farmers have little knowledge about microfinance, which incites them to accept the first offer proposed to them independently from conditions and prices. Indeed, Cohen (2010) asserts that "in increasingly complex and competitive financial markets, consumers with low levels of financial literacy lack the information and tools necessary to make informed decisions".

As mentioned in one of the interviews, a typical poor producer farming two manzanas of corn, needs to invest about 440 dollars inputs. One harvest brings him about 70 quintals valued at 15 dollars (market price in December 2010), which represents about 1050 dollars; he therefore earns about 600 dollars. With a one-manzana irrigation system, he can harvest three manzanas per year instead of two, which gives him about 900 dollars. The cost of the micro-irrigation system for one manzana is 650 dollars and that of a credit between 30 and 40 percent. This represents a total cost of between 850 and 940 dollars, which approximately equals the yearly income of the small producer. It is therefore clear that interest rates have a major impact on the ability of poor farmers to raise their revenue. For vegetable, however, returns are higher than for corn. According to a study carried out by Zbinden and Pong (2005), the net income (total income less inputs) for growing tomatoes with a micro-irrigation system, averages about 2'360 dollars[18] per manzana per cycles and the median income is about 1358 dollars. Even if those are market prices of 2005, it is obvious that for the smallest producers, growing vegetables has a greater potential in raising their incomes, especially tomatoes, which are the vegetable with the highest added value.

A further important element that has been mentioned by one of the interviewed farmers

[18] Average net income of one tarea (541m2) = C$ 3,013 (Córdoba = US$ 16.5 in june 2005), while the median is C$ 1,724

is the fact that credit is essential in order to acquire a micro-irrigation system, however it is not enough. Additional services are essential, such as technical assistance for the installation of the micro-irrigation system, but also inputs such as seeds and fertilizers, and advice on how to apply them, because micro-irrigation makes it possible to sell products off-season at higher prices than in the season, therefore it is essential to maximize yields in the dry season. Hence, in order to maximize the efficiency of an irrigation system, it is essential to have the right amount of seeds and fertilizers available and the knowledge on how to apply them efficiently.

Since poor farmers admit to need a loan in order to acquire a micro-irrigation system and hence to increase their income, it is important to make sure that the microcredit does really have a positive impact on farmers' quality of life. The study carried out by FIDEG (2007) on beneficiaries of microcredit shows the change of farmers' standard of living after having been granted a loan. As illustrated in table 3, 81 percent of the producers who reveiced a microcredit by a Nicaraguan MFI affirmed that their quality of life improved after having been granted a microcredit while only 4 percent declared that their quality of life worsened. However, the improvement in standard of living depends on the size of the land owned. A microcredit has the greater impact on producers owning land from 10 to 50 manzanas with 96 percent confirming a positive impact on their quality of life. However for farmers that own areas smaller than 2.5 manzanas, 73 percent recorded an improvement, whereas 22 percent reported that their standard of living worsened. This points out that there seems to be a minimum land size for a loan to have the most positive impact on producers' quality of life. When farmers' plots are particularly small, MFIs probably need to boost income diversification and/or technological improvement of the production processes in addition to granting a loan (FIDEG, 2007).

Sizes	Improved	Equal	Worsened
Without land	74%	20%	6%
<=2.5 manzanas	73%	5%	22%
2.51 A 10 manzanas	78%	22%	0%
10 to 50 manzanas	96%	4%	0%
50 to 100 manzanas	87%	13%	0%

Table 3. *Farmers' life improvement after credit according to land sizes (Source:Fideg, 2007)*

Furthermore, the FIDEG study indicates which business improvements have been caused by the access to credit. As shown in table 4, 60.6 percent of the beneficiaries of an agricultural microloan affirmed that access to more materials and inputs was the main cause of their business improvement. In deed, it enables small farmers without access to bank credit to produce basic grains or vegetables all over the year. Also 21 percent of

these farmers reported that the granting of a loan resulted in an improved access to credit, such as increased loan size, granting of another type of loan, or continuity in the credit flow.

Indicators	
Greater access to credit	21.0%
Greater access to material and inputs	60.6%
Better infrastructure and facilities	5.6%
Business diversification	7.2%
Demand increase	1.3%
Improvement of the general economy	3.3%
Improvement of the business security	1.0%

***Table 4**: Reasons for business improvement due to microcredit (Fideg, 2007)*

Last but not least, the FIDEG study examines the amount of choice that loan beneficiaries have. The results indicate that MFIs are essential in rural areas. Indeed 52.8 percent of rural credit beneficiaries reported that if they had not been granted the credit they asked at a particular MFI, they would not have applied for a loan at another institution (while in urban areas, the corresponding figure is 38.2 percent). This demonstrates that in rural areas very few microcredit options are available to poor people, which was as well mentioned as a reason why interviewed farmers had no access to microfinance.

5.2 MICROFINANCE SUPPLY FOR IDE MICRO-IRRIGATION SYSTEMS

In order to assess if the needs of BOP farmers in terms of microfinance can be fulfilled, microfinance providers in Nicaragua have been interviewed about the products and conditions they can offer to small farmers. 12 NGOs specialized in microfinance have been interviewed, as well as two banks, four producers' cooperatives, two saving and credit cooperatives (SACCOs), and five unspecialized NGOs.

5.2.1 MICROCREDIT

Microfinance NGOs have three different credit methodologies addressed to rural clients:

- Individual credit is the most common methodology and is offered by all interviewed microfinance providers.
- Group credit is provided by eight from the 12 interviewed microfinance NGOs, as well as by one unspecialized cooperative and two unspecialized NGOs. It usually includes three to ten persons according to institutions. All group members respond for each other but the credit is granted to the individual. The loan amounts are usually smaller than by individual credits.
- Finally communal bank credit is offered by two specialized NGOs, only in selected

areas. It includes 12 to 30 members and targets the poorest farmers with credit amounts from 40 dollars on. The credit is granted to the bank, not to the individual.

In order to be granted a microcredit, farmers need to fulfill several requirements, which often prevent them from accessing microfinance. These conditions vary according to institutions and loan amounts. Microfinance NGOs usually ask the following elements:

- The farmer must reside close to an office branch
- (S)he has to possess an identity card
- (S)he has to be between 21 and 65 of age (or 66)
- (S)he must have an established business for at least one year, often two
- (S)he must not be registered in negative clients' databases or risk centrals, which means that the farmer must never have been in default in any other institutions
- (S)he has to be moral solvent, which is evaluated during the interview with the farmer and his/her neighborhood
- (S)he have to own acceptable collateral of one to one and a half time the credit value. For larger loans (usually superior to 2'000 dollars), a mortgage is needed
- (S)he must have a guarantor, who also has to meet several requirements
- In some cases, the farmer must be owner of the property
- In some cases, a receipt of a water and electricity bill is as well required

For group and communal bank credits, fewer requirements are requested. Sometimes (in most cases for communal bank credit) the required age, an identity card, moral solvency and the co-responsibility for the other group members is sufficient. However, group credit methodologies often require as well collateral of one time the credit value.

As for banks, the requirements are basically the same than those of microfinance NGOs, however, they additionally require commercial and personal references, an investment and business plan, a receipt of an electricity bill, and a warranty deed.

With regards to unspecialized cooperatives, the requirements to get a loan are not always well defined and often less strict than by other microcredit providers. In addition to be member of the cooperative, farmers usually need collateral, a certain number of years in the cooperative (one to three), moral solvency, the capacity to pay (according to their production), and in the case of unions of cooperatives, the previous agreement of the cooperative committee is needed before the definitive agreement of the union of cooperatives. Members in a cooperative usually know each other, hence subjective factors such as the reputation of the borrower have a greater relevance than they do by other providers and might compensate for other unfulfilled requirements.

Finally unspecialized NGOs usually require farmers to be beneficiaries of one of the NGO's

social projects. The other requirements are similar to those for cooperatives but usually more flexible (with an exception that has similar prerequisites than microfinance NGOs).

The conditions required by MFIs to be granted a loan clearly represent an obstacle for BOP farmers to access microfinance. Minimum credit amounts is a further element that reduces the accessibility of microfinance to BOP farmers, as the latters often need loans that are inferior to those that MFIs are willing to provide. As illustrated in table 5, seven from the 12 interviewed microfinance NGOs offer a minimum loan amount between 50 and 100 dollars, whereas the five others offer minimum credit amounts between 150 and 300 dollars. The two interviewed banks do not provide microcredit under 1'000 dollars, which means that they do not directly attend the studied target group. SACCOs offer minimum loan amounts between 100 and 140 dollars and finally, unspecialized cooperatives and NGOs offer minimum loan amounts between 50 and 150 dollars.

After considering the requirements for BOP farmers to be granted a loan, as well as the willingness of MFIs to provide small-amount loans, one of the most important factors for BOP farmers to get access to microcredit is the price required for loans.
Table 5 shows that for the seven microfinance NGOs offering microloans under 100 dollars, the price of a 100 dollar credit for one year[19] amounts between 28 and 51 percent of the credit value. For a 300 dollar microcredit, the 12 microfinance NGOs have prices between 24 and 44.6 percent.
Such rates arise because microfinance NGOs have to comply with the central bank interest rate, which varies constantly but adds up to 16-18 percent a year. Additionally, NGOs specialized in microfinance require a commission tax, which is expressed in a monthly rate or in a one-time rate at the disbursement. Furthermore legal fees to publicly write the contract have to be taken into account, which amount between five and 20 dollars. Some MFIs add as well a mandatory insurance, and finally for loans in cordobas, the local currency, some institutions require a devaluation tax. All this costs have been included in the costs of a one-year credit in table 5. As stated in the Economic Intelligence Unit (2008), the microfinance market in Nicaragua clearly lacks transparency. MFIs do not reveal easily price information, which is why figures in Table 5 are to be considered

[19] In order to be able to compare the credit prices of the different institutions, this thesis calculates the prices for a one-year credit even if most credit have to be reimbursed in less than one year. Similarly it calculates the costs only for a $100 and a $300 credit. It does so because some institutions include all their costs in an annual interest rate while others have a composition of a fix fee per contract, a monthly interest rate and a rate at the disbursement. Therefore the cost for a one-year $100 or $300 credit is not always equal to the annual interest rate (the annual rate might be smaller for a longer period or a bigger credit for some institutions while it can stay equal for other institutions that include all their costs in an annual rate).

as an approximation of the actual loan prices.

Indeed, as mentioned in chapter 4, when serving poor rural areas, MFIs have high transaction and operating costs. The interviews with coordinators of ASOMIF and PROMIFIN[20]confirm that the average operating costs of an efficient MFI are about 30 percent. The cost of capital amounts to 11-12 percent, the operative costs are about ten percent and an additional eight percent is counted for provisional and other costs. However, the prices of rural credits are often subsidized by the prices of commercial credits, which have lower transaction costs. This enables some MFIs to offer rural microcredit at a rate from 24 percent on.

The cost for one-year bank loan is clearly lower than by microfinance NGOs: from 12 percent for the state bank to 24 percent for the other interviewed bank. This can be attributed to the fact that banks do not grant small loans and require formal collateral, which reduce screening and monitoring costs.

Concerning both interviewed SACCOs, the state subsidized cooperative offers an annual price of ten percent, with an additional three percent mandatory savings going on the borrower's saving account. This is by far the best alternative for small producers. The other SACCO offers credit at 42 percent, which is in the upper range of MFIs prices.

As for unspecialized cooperatives, they offer loans to their members at lower prices than microfinance NGOs. Prices of a one-year 100 dollar credit range from 11.4 to 24 percent.

Finally, unspecialized NGOs offering microcredit usually have low credit prices, from 15.6 to 21 percent for a one-year 100 dollar credit. However they do not seek to be financially sustainable in the first place, as do microfinance NGOs. Also, the funds of unspecialized NGOs that enable them to provide loans under their real costs depend on foreign donors and rotation funds, which might be limited in time or withdrawn from one year to the other. Moreover, credits offered by NGOs usually have a greater default rate, as farmers are subject to less pressure to repay the loan. From the four interviewed unspecialized NGOs, there is one exception, PAC, who requires a price of 45 percent for a one-year 100 dollar loan. This is first because it has 20 dollars fix fees, which makes the price of a 100 dollar credit very expensive. Second, PAC has developed a financial services area, whose administration and operation are in line with the performance standards of non-bank financial institutions.

[20] Program of strenghtening of financial services, funded by the Swiss Agency for Cooperation and Development - SDC. The objective of the program is to promote the outreach of financial services for low income populations. www.promifin-cosude.org

Types	Banks		NGOs specialized in microfinance												SACCOs		Producers' cooperatives				Unspecialized NGOs			
Institutions	**Produzcamos**	**Bancentro**	**Acodep**	**ADIM**	**Afodenic**	**Ceprodel**	**FDL**	**Finca Nic**	**FJN**	**Fudemi**	**Fund 4i2000**	**Fundenuse**	**Micredito**	**Prestanic**	**Caruna**	**Iaguei**	**Ilos**	**Aldea Global**	**UCASUMAL**	**UCPCO**	**Anfam Credito**	**ADDAC**	**Cuculmeca**	**PAC**
Individual microcredit	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Group microcredit	no	no	yes	yes	no	no	yes	yes	no	yes	yes	yes	yes	no	no	no	no	yes	no	no	yes	no	no	yes
Communal bank credit	no	no	no	no	no	no	no	no	no	no	yes	no	no	yes	no	no	no	no	no	no	no	no	no	no
Minimum indiv. Credit in US$	1000	1000	100	300	300	100	100	50	300	200	100	50	100	150	140	100	50	120	100	50	150	150	50	50
Minimum group credit in US$	n.a.	n.a.	100	140	n.a.	n.a	100	50	n.a	200	40	50	50	50	n.a.	n.a	n.a	120	n.a	n.a	150	n.a	n.a	50
Cost of a 1-year $100 credit in %	12	24	37	n.a.	n.a.	47	28	39.6	n.a.	n.a.	30	34.6	45.6	28	10	42	24	11.4	14	18	15.6	19	21	45
Cost of a 1-year $300MC	12	24	30	39.9	24.0	36	28	39.6	26.6	26.0	30.0	35.0	45.6	28	10	42	24	11.4	14	18	15.6	19	21	31.3
Details of credit costs																								
Annual interest rate	*11%*	*18%*	*24%*		*24%*		*22-28%*	*39.6%*		*15%*	*30%*	*30.1%*		*25%*	*8%*			*10.7%*	*12%*	*18%*		*16%*	*21%*	*15.6%*
Monthly rate				*3.32%*		*2-2.5%*			*1.3%*				*3.8%*			*3.5%*	*2%*				*1.3%*			
Commission rate at disbursement	*1%*	*5%*	*3%*			*3%*	*2.25%*		*3%*	*6%*		*3.5%*		*3%*	*3%*			*0.7%*	*2%*			*3%*		*9%+ $5*
Legal fees		*1%*	*$5-15*			*$10-15*				*$7-15*														*$15*
Credit insurance				*incl.*			*incl.*	*incl.*	*$2 per month*															

***Table 5**: Credit supply of Nicaraguan MFIs. (Source: interviews with MFIs coordinators)*

5.2.2 MICRO-LEASING

In 2004, Nitlapan[21], a Nicaraguan institute promoting local development initiatives by providing financial and non-financial services to micro, small and medium businesses, started a cow-renting program. This program consists in giving small farmers the possibility to rent a cow for 0.35 to 0.65 dollar a day, depending on the type of cow. After one year, farmers give back the cow and keep the cow's products, i.e. the milk and the calves. Similarly, Nitlapan offers the option to buy the cow at the end of a three-year renting period (leasing). The only requirements for farmers are to know how to care for cows or be ready to learn it, and have food, water and shade available for the animal.

This program has been successful, because it enables poor farmers to quickly generate income, to increase food security and to be inserted in the market by selling the milk.

However one of the problems highlighted in the interview with Nitlapan is that farmers are not always able to care well for the cows because they might lack the necessary forage to feed the animals. In this case, Nitlapan can rent machines for farmers to produce forage.

This program has shown that micro-leasing is a good option when the financial means of farmers are scarce, when they lack collateral and when the leased asset generates the income, such as the cow in this example.

However, micro-leasing products are not yet common among MFIs in Nicaragua. ASOMIF mentioned the lack of legislation as the main cause for the lack of such products on the market, and included a paragraph about micro-leasing in its proposal for a microfinance law, which states that micro-leasing should benefit from similar fiscal advantages than regular leasing, such as the exemption from the Value Added Tax (IVA).

Only one interviewed microfinance NGO (FDL) offers micro-leasing. FDL provides micro-leasing for farming machines at costs inferior than those of a microloan, thanks to quantity discounts granted by providers. Another specialized NGO, MiCredito, is in negotiation for a micro-leasing agreement with IDE, which is discussed in chapter 6.

5.2.3 SAVINGS

In Nicaragua like in many other countries, NGOs are not allowed to collect deposits. Although ASOMIF has sought legislation that would enable NGOs to collect savings through the proposal of a microfinance law, its attempts have been so far unsuccessful.

Notwithstanding, PROMIFIN is supporting a financial education program, which focuses on saving as one of three main topics. This program, followed by several MFIs, stresses the importance of saving and understanding the cost of a loan. It seeks to teach the poor that by buying only the necessary and being disciplined, it is possible for them to save.

[21] www.nitlapan.org.ni

SACCOs are the only institutions providing saving accounts for the poorest farmers in Nicaragua. For instance Caruna requires a five percent deduction for each credit it grants, three percent of which is deposited on the saving account of the member.

5.2.4 MICRO-INSURANCE

Four[22] interviewed microfinance NGOs declared having micro-insurance as a compulsory part of their loan contracts, in order to cancel the credit in case the borrower dies and to financially help for the funeral. The prices vary from one percent of the credit value to two dollars a month. Since including micro-insurance as a compulsory part of microcredit makes the loan more expensive, it is questionable, especially for the smallest loans, whether a lower interest rate without insurance would be better adapted to poor people than a higher rate with insurance.

Also, ASOMIF mentioned a pilot project for a harvest micro-insurance, but only for specific products (coffee and peanuts) and for medium to big producers. With such insurance, as the risk that the farmer does not pay back the credit is lower, the price of the loan should as well be lower. Whether it would be advantageous for small producers depends on the cost of the insurance, the extent of the risk of loosing the harvest, and finally on the discount obtained on the microcredit.

5.3 GAP BETWEEN MICROFINANCE SUPPLY AND DEMAND

The outcome of the interviews with BOP farmers and microfinance providers reveals that there are clear gaps between the supply and demand for microfinance products in Nicaragua. Those are explained below within the frame of the triangle of microfinance.

5.3.1 OUTREACH

Due to their location in remote areas, most farmers have little access to microfinance, as few or no MFI is present in their community. There is a clear lack of choice and availability in financial services for poor farmers, because it is very expensive for MFIs to serve clients in remote areas, especially small clients. Therefore MFIs need to find ways to be present and expand their networks in remote areas at reasonable costs. An interesting solution proposed by Nagarajan and Meyer (2005) to reduce transaction costs, is piggybacking. This method consists in providing financial services at points where clients from remote areas regularly travel to obtain non-financial services. For example, in the remote hills of Nepal, where farmers regularly walk several hours to deliver their milk to a dairy

[22] FDL, FJN, Finca Nic, and ADIM

cooperative, they can deposit money at the same time they sell their milk (Hirschland, 2003b, in Nagarajan & Meyer, 2005).

A further important obstacle preventing poor people to access microfinance is collateral. No MFI grant microcredit without securing the loan by a collateral, however the poorest farmers often have no belonging that can be accepted as guarantee. New products need to be developed in order for BOP farmers to access microfinance even without collateral. Micro-leasing is such a product. It is discussed in chapter 6.

5.3.2 IMPACT

Providing microcredit to poor farmers so that they can acquire micro-irrigation systems is a good tool to reduce poverty, however this alone will not raise farmers' incomes. They also need seeds, fertilizers and advice in order to insure the impact of the microcredit. For instance, Mahajan and Vasumathi (2010) assert that besides the provision of micro-credit, agricultural development services are essential to give farmers knowledge of improved practices, strengthen their links to markets, and hence raise their incomes.

"Multiple-products solutions" have thus a great potential in improving the impact of microcredit. For example, Wiedmaier-Pfisterand and Klein (2010) describe a pilot project consisting in a "multiple-product solution", piloted by the MFI BASIX, an insurer, and the World Bank in India. This project consists in a weather-based insurance product embedded in loan contracts and combined with compulsory savings accounts. The MFI BASIX and a commercial insurer provide a micro-insurance scheme based on a rainfall index, where payments are dependent on whether rainfall measured at a local weather station reaches a certain threshold. The insurance guarantees as well the repayment of the loan in case of bad weather. Some elements remain unresolved, such as poor-quality weather data, basis risk, high premiums, clients' difficulties understanding this complex product, and low demand due to these factors, nevertheless, the Indian weather insurance market is growing strongly, and new micro-insurance providers are appearing.

A case study illustrating a multiple-products package is described in chapter 6.

5.3.3 SUSTAINABILITY

Interest rates are certainly the major sustainability issue in microfinance. The costs of delivering small credits in poor rural areas are high, which is reflected in the loan prices for farmers. And if MFIs aim at being financially sustainable, they cannot offer microcredit under its real cost.

For poor producers, cooperatives' credits represent a good solution, since loan prices are clearly lower than by microfinance NGOs. However most cooperatives (and unspecialized

NGOs) identified the lack of sustainability and uncertainty of their funds as the main obstacle to insure continuity in granting microcredit. Linkage between cooperatives and formal financial institutions can provide access to more sustainable funds for cooperatives. A case study illustrating this issue is discussed in chapter 6.

6 SELECTED CASE STUDIES

Building on the highlighted gaps between the demand and the supply of microfinance in Nicaragua, this chapter sheds light on four case studies that illustrate solutions to overcome some of those gaps. The first case study is a case studied during the field research in Nicaragua, whereas the three other ones are literature case studies from other countries, whose applicability remains to be tested in Central America.

6.1 MICRO-LEASING AGREEMENT: MICREDITO AND IDE, NICARAGUA

This case study builds on observations collected during the field research in Nicaragua as well as on interviews conducted with MiCredito representatives and small producers.

MiCredito was founded in 2004 by the international organization MEDA[23], which is involved in microcredit in Nicaragua since 1990. MiCredito has been established to provide an improved level of services to the poor and to target the underserved rural market in Nicaragua (www.micredito.com.ni). Hence, MiCredito targets similar clients than does IDE. Aware that micro-irrigation systems have a great potential in increasing the incomes of small farmers, but also that the latter often lack collateral in order to be granted a loan for the acquisition of such a technology, MiCredito has shown great interest in developing together with IDE a micro-leasing product to give BOP farmers access to micro-irrigation.

This micro-leasing agreement is a pilot project in which IDE sells micro-irrigation systems to MiCredito, who leases them to three small producers, members of the cooperatives' union ILOS. If the project is successful, it shall be repeated with further producers. Since the leased asset, i.e. the micro-irrigation system generates (additional) income, and since small ILOS producers usually lack collateral to get access to financial services, micro-irrigation system is a suitable asset to be leased to this target group.

The micro-leasing agreement in question is therefore a three-party contract between:

1. A farmer from the union of cooperatives ILOS who needs the irrigation system
2. The MFI MiCredito who buys the irrigation system and leases it to the farmer

[23] Mennonite Economic Development Associates (MEDA). International organization that creates business solutions to poverty around the world. www.meda.org

3. IDE who provides and sells micro-irrigation systems to MiCredito, and gives technical assistance to farmers.

Several meetings have been organized with representatives of IDE and MiCredito, with the head of the union of cooperatives ILOS, as well as with several cooperatives' members interested in using IDE irrigation systems. During these meetings, demonstrations of micro-irrigation technologies have been carried out and the concept of micro-leasing has been explained to small producers.

The pilot project shall include only a limited number of producers. IDE is in charge of a pre-selection of clients, in order to ensure that farmers meet some technical and agronomic requirements such as the availability of a near water source or the suitability of micro-irrigation for particular crop types. MiCredito executes the definitive selection. It sets the following requirements for potential customers:

- The client must be full of age
- (S)he has to be a farmer
- (S)he must be in the attendance zone of a MiCredito office
- (S)he must present a photocopy of his/her identity card
- The farmer must have twelve months working in the activity for which (s)he requires the micro-irrigation system
- (S)he must not be registered in any risk central or bad payer database
- His/her financial and economic evaluation must be good
- (S)he has to pay a 5% deposit of the value of the asset

MiCredito is thus is in charge of evaluating and approving potential clients, designing the micro-leasing product, and finally renting the micro-irrigation system. For its part, IDE delivers and installs the systems and is responsible for technical assistance. The advertisement is task of both MiCredito and IDE.

There are clear advantages of a micro-leasing contract over a loan contract. The provider enjoys a greater repayment security as the MFI purchases the product. Also the risk of clients defaulting is lower as the MFI owns the leased assets and can remove it in case of non-payment. Finally, the farmer does not need collateral and can choose to give back the product if he does not need it anymore, or cannot afford it anymore.

However, for micro-leasing to be an affordable tool to increase small producers' revenues, some conditions hold. First, the price of the leasing contract should not exceed that of a microcredit. The MFI and the provider should collaborate in order to offer the best alternative for small producers. Second, technical assistance from the provider is crucial since if the producer is not able to make the system work, he will not pay the leasing

installments to the MFI. Third, it is important to make leasing payments flexible because farmers' incomes are dependent on seasonality and weather conditions.

The first outcome of the pilot project is that prices required by MiCredito lack transparency and are very high for poor farmers. MiCredito requires a fix fee of 30 dollars for the public writing of the contract and the risk central check. Additionally, the leasing rates range from 38.3 percent for a one-year period paying in semester quotes to 63.5 percent for a two-years period paying in annual quotes, which exceeds the price of microloans.

To conclude, it can be fairly summarized that the concept of micro-leasing is very interesting for the poorest farmers lacking collateral, however it is essential to include all contract parties - that is the MFI, the providers and the farmers - in the negotiation of the leasing conditions to be sure that those are suitable for all parties, especially for small farmers who usually have a lower bargaining power.

6.2 MULTIPLE-PRODUCTS SOLUTION: BASIX, INDIA

Mahajan and Vasumathi (2010) have documented the experience of BASIX in combining extension services with agricultural credit in India. This case study illustrates how multiple-products solutions combining financial with non-financial services can considerably improve the poverty impact of a microcredit. The findings of this experience are described below.

BASIX is an Indian livelihood promotion institution working with more than a million poor households. When it started in 1996, BASIX's main focus was providing microloans to its clients. In 2001 an impact assessment was carried out. Only 52 percent of the customers who had received at least three rounds of microcredit showed a significant increase in their income, 25 percent declared no change in income level, while 23 percent reported a decline. BASIX carried out a study on why many clients showed no increase or a decline in income: the results can be grouped into three factors: unmanaged risk, low productivity, and poor terms in market transactions.

Consequently BASIX started providing a complete set of livelihood promotion services to rural poor, including provision of financial services, agricultural, livestock, and enterprise development services (AGLED), and institutional development services.

BASIX works in more than 25,000 villages through a network of 150 branches, each with five field executives under a team leader. Each field executive supervises five livelihood service advisers, who each cover about ten villages, originating credit, selling insurance, and collecting repayments. BASIX field executives select villages or clusters of villages to receive these services. The branches start enrolling customers for services in villages

where there are at least 30 existing borrowers for crop or livestock activity. BASIX has built a cadre of nearly 1,000 livelihood services providers who are typically high-school graduates with training as a para-extension worker or a para-veterinarian.

In 2009 BASIX had nearly half a million customers for AGLED services. About half of these customers were using agriculture and livestock services, and the rest were using services related to nonfarm activities. For agriculture, AGLED provided soil-testing service to more than 20,000 farmers, integrated pest management or integrated nutrient management services to nearly 75,000 crop customers, and field surveillance to more than 30,000 farmers. It connected most customers to markets for inputs (seed, fertilizers, pesticides, and bio-inputs) and outputs. Weather index-based crop insurance was provided to more than 10,000 farmers in collaboration with private insurance companies. For Livestock, BASIX AGLED services conducted health checkups of nearly 440,000 animals, vaccinated nearly 165,000 animals, and dewormed 125,000 animals. It trained more than 36,000 customers on feed and fodder and better dairying practices. More than 60,000 farmers were linked to milk marketing chains of cooperatives or private dairy companies. Livestock insurance was provided for more than 120,000 animals, in collaboration with private insurance companies.

Initially, the emphasis was placed on market research to identify which services farmers needed. This research, conducted through several field visits and group interactions with farmers, showed that small farmers prefer cost-saving and risk-reducing interventions than yield-enhancing services requiring greater cash. The next step consisted in designing the service offerings. Local agricultural universities and research stations made available many packages of practices for increasing yields, so BASIX decided to focus more on cost reduction. One successful example was the introduction of soil testing, which led to more precise and economical application of fertilizers. Based on such experiences, BASIX staff learned how to customize AGLED services for different agroclimatic zones, which enhanced the farmers' willingness to pay for these services. Customer satisfaction surveys found that the satisfaction level was nearly 80 percent. BASIX is now testing mobile phone–based monitoring of service delivery through which farmers will be able to report incidents of no visit or poor service.

BASIX made a modest profit of nearly 450'000 dollars providing these services to almost half a million customers. With more and more livelihood services providers reaching the breakeven number of clients, profitability is likely to improve. BASIX has worked mainly in poorer dry land districts, but it is also considering providing AGLED services in irrigated districts where it has no credit operations. It is confident in reaching 2 to 3 million farmers with AGLED services in the next five years.

6.3 VALUE CHAIN LENDING: GAPI, MOZAMBIQUE

Simonetti, Wuyts, and Wuyts-Fivawo (2007) reported about a case study of value-chain lending in Mozambique, building on the provision of business services together with credit and on strategic partnerships. This case study is described below.

The small financial institution GAPI[24] was set up in 1984, as a project for the promotion of small firms. In 1990, the project was transformed into a financial institution owned by a German NGO and a state bank. GAPI was then privatized in 1997. Since GAPI is a non-bank financial institution, it cannot collect deposits to finance its lending activities, but instead relies on its own funds, on credit lines, and on donors who also fund the MFI's activities in business development services, training, and technical assistance for small farmers. According to the International Finance Corporation (IFC), GAPI is the only MFI in Mozambique that "targets the agricultural sector with more reasonable rates", and, "the only relevant player in rural finance… willing to find creative solutions to lack of collateral" (IFC, 2004 in Simonetti, Wuyts & Wuyts-Fivawo, 2007).

GAPI noticed that the availability of credit was not sufficient to stimulate rural production, but that it was as well necessary to make producers bankable by addressing factors constraining production quality. GAPI adopted an innovative approach to finance rural development focusing on value-chain lending, which consists in three elements:

- The integration of credit supply with the improvement of the borrowers' ability to repay loans through the provision of business services.
- The practice of value-chain lending, through which GAPI develops clusters of innovation by supporting the whole chain of production. The key objective is to make the whole value chain work effectively by encouraging coordination among the networks of producers and traders along the value chain, considering supplier-customer relationships, economic incentives, market structure, ownership structure, economies of scale and scope, and the promotion of quality and learning.
- The strategic use of partnerships in order to support the development of a sustainable value chain and to extend the range of competencies.

The recovery of the Mozambican processing industry started with a partnership between a Portuguese entrepreneur, the American NGO TechnoServe offering technical and managerial expertise, and GAPI, providing the necessary funds to start the new venture in 2003. A key feature of this approach was the use of labor-intensive technology, such as simple hand-operated machines produced and maintained locally, that do not need rely on

[24] "Gabinete de Consultaria e Apoio a Pequena Industria"(Unit for Consultancy and Assistance to Small Firms)

expensive, unreliable electricity, and that produce higher quality processed nuts. This technology also requires low capital and operating costs per unit, making it attractive for areas in which finance is scarcely available.

In addition to the adoption of an appropriate processing technology, other critical challenges to the growth of the sector include producer support, accessing international channels of distribution, the promotion of quality, and the availability of finance at fair cost (UNCTAD, 2004, in Simonetti, Wuyts & Wuyts-Fivawo, 2007).

Concerning the support of producers, their small size prevents them from exploiting economies of scales and makes them vulnerable in dealing with large traders and processors. Small producers also face a poverty problem, which creates competition between investment in cash crops and food crops needed for survival, and limits the investment in learning about tree maintenance or quality. A key solution to this problem is the creation of producers' associations, which has been undertaken on the basis of an existing project. Producers' associations have the advantage that members can spread their risk, increase their bargaining power against buyers and achieve economies of scale in storage and transport. It also makes learning and diffusion of good practice easier. Finally, associations can provide microfinance to their members.

A further challenge for the functioning of the value chain is the access to international distribution networks. TechnoServe and GAPI needed to address marketing and distribution issues to access export markets. For example, brand visibility is a key concern, because being recognized in the world market is a condition to export to industrialized countries. Access to export markets has been helped by the creation of AIA, an association of nuts processors.

Another important issue is the promotion of quality that had been put aside by producers in the nineties. Foreign traders use their knowledge about quality by buying the raw nuts at low prices from producers and paying export tax at the low-quality level. Farmers, therefore, have little incentive to improve production. Because the price paid in international markets for cashew nuts strongly depends on quality, the reintroduction of quality is necessary to improve the revenues of both producers and processors. So TechnoServe promoted learning in quality recognition at all levels and transmitted the responsibility for quality knowledge to AIA and producers' associations.

Finally a key challenge for the value chain development are finance issues. Setting up an efficient domestic financial system in rural areas is vital because of the competition with established foreign traders, who have easy access to foreign finance. One of the causes of the scarce availability of finance in rural areas is the lack of the collateral necessary to secure loans. Taking advantage of its partnership with TechnoServe, GAPI has introduced

an innovation that accepts as guarantee the business plans prepared by TechnoServe. So GAPI uses the knowledge that future streams of income will repay the initial investment as guarantee. However processors need short-term loans to fill the gap between the high expense for buying the raw nuts and the returns from the sales of processed nuts spread throughout the year. Since the working capital required is extremely high, GAPI was not able to raise the amount of cash needed because it is not a proper bank. Finance for working capital has been found with the help of USAID, which has opened a line of credit for the working capital through a local bank.

This case illustrates the importance of supporting the whole value chain since the success of an industry critically depends on the viability of suppliers of raw products, the achievement of scale economies necessary to access international distribution networks, learning about quality throughout the value chain, and the access to reliable finance at reasonable rates. Finally, the role played by TechnoServe in the cashew industry highlights the importance of partnerships in order to extend the range of competencies available to improve the demand and supply for credit.

6.4 VILLAGE SAVINGS AND LOAN ASSOCIATION MODEL - LINKAGE WITH FORMAL FINANCIAL INSTITUTIONS

In an agriculture and rural development discussion paper, Ritchie (2007) discusses the Village Savings and Loan Association Model (VS&LA) as a financial model able to, and effective in reaching poor people that leave in too remote areas to be reached by traditional MFIs or banks. This subchapter builds on this paper. The VS&LA model has been developed by CARE International in Niger in 1991, and has been replicated in several other countries. The initial approach was aimed at poor uneducated rural women but evolved to target general undeserved rural areas by providing a safe place to save and the possibility to borrow small amounts.

The VS&LA model is a system in which groups of ten to 30 persons are trained by a field agent in order to subsequently manage their saving and loan activities independently.

Group members either contribute a fixed amount on a weekly basis, usually averaging 0.15 dollar or buy between one and five shares at every meeting, that have a fix price set by the group. After several weeks, the group starts making loans to members, with terms and interest rates decided by the group. Own savings are the only source of loan capital. There is thus no external long-term dependency for technical support or loan fund capitalization.

Usually, a field agent initiates the VS&LA model and attends group meetings during the first three months to teach elements such as the establishment of a management committee, internal rule making, loan procedures, interest and penalties, problem

solving… Group members have passbooks, but there is no other written record. Two members count the cash each week, which is kept in a lockbox with three separate keys held by three different officers that need be opened at the same time to allow access, which reduces the chances of fraud. After the training period, the village agent takes a more passive role, progressively allowing the participants to carry more responsibility. At the end of the year, the field agent conducts an evaluation, discusses problems, and trains members on the annual distribution of assets. The savings and interest collected on loans are distributed to members; some may be retained to start the next annual cycle of loans. Groups then restart operations, after allowing members who do not want to continue to leave and others to join. Members can also withdraw their savings at any time throughout the cycle, if needed.

The loans given out by the group tend to be used almost exclusively for income-generating activities. The advantages of the VS&LA model lie in the fact that it is easy to understand and to replicate, cheap to establish, transparent in its operations, it can be managed by local people, it is not donor driven, and it is independent from outside investment. Most importantly, it does not depend on long-term technical support, which differentiates it from many other community-based microfinance methodologies.

Even if VS&LA models are supposed to be independent from outside funding sources, there is much discussion about linking such MBOs with the formal financial sector. In deed, MBOs linked to banks or MFIs can potentially access a more diverse range of financial services for their members than those they are able to provide themselves. Links range from using the bank solely as a secure place to hold member savings to accessing loan funds and insurance.

Similarly, for a bank or an MFI, providing financial services to sustainable MBOs enables them reaching customers they could not serve cost-effectively alone. In deed, partnering with an MBO reduces bank's costs by making loans to a MBO that on-lends the funds to its members, instead of making individual small loans to poor producers, where they would take responsibility for the loan appraisal and repayment. In this way, MBOs can become key institutions of financial intermediation in areas in which banks or traditional MFIs find it difficult to operate profitably.

However for this link to be built, the MBO has first to demonstrate that it is sustainable and creditworthy through on-time repayment of internal loans. Banks are often eager to develop a relationship especially when they have the mandate to provide services to rural people but find it difficult to do so, unless the poor are organized in sustainable MBOs.

Therefore VS&LA models linked to MFIs might enable members to access larger and cheaper loans than those from their internal sources. Indeed, linkage to a bank or MFI may

enable members to borrow for investment in livelihood activities that cannot be financed through the MBO's own funds. Such links also provide a secure place to keep member savings that are not lent internally and provide access to other financial services such as insurance.

7 RECOMMENDATIONS AND PRACTICAL IMPLICATIONS

Departing from the highlighted gaps between the demand and supply of microfinance for BOP farmers in Nicaragua as well as from the described case studies proposing solutions to reduce those gaps, suitable products and conditions targeting BOP farmers in Central America are recommended. Subsequently practical implications regarding partnerships, the legal framework, and the level of interest rates are explained.

7.1 PRODUCTS

This subchapter gives recommendations in three different areas. First a multiple-products package is presented; subsequently recommendations in terms of micro-leasing agreements and savings are given.

7.1.1 MULTIPLE-PRODUCTS SOLUTION

The GAPI value chain lending case study and the BASIX case study have shown that microcredit is not sufficient to raise the income of poor rural households, since they need as well development services to improve their farming practices and strengthen their links to markets. Building on this concept, the idea emerged to create a fund managed by a retailer of IDE's products to finance multiple-products solutions for small farmers. An important credit would be provided by an MFI or a bank to this micro-irrigation retailer, who would use the fund to provide a complete package including micro-irrigation systems, seeds, fertilizers, as well as technical and agronomic consulting to small farmers.

According to the estimations of a retailer of IDE's products, for an area of 1'000 square meters tomatoes, 1'000 dollars investment would be necessary to provide seeds, micro-irrigation and fertilizers. After a three-months period, the small farmer can harvest for about 5'000 dollars according to current market prices, which represents a return on investment of 500 percent. Therefore, the retailer estimates that he could require 2'000 dollars back from small producers. 500 dollars would be his income for consulting services and 1'500 dollars would be reimbursed to the fund, which means that the fund would have a 50 percent interest rate.

If the fund is created to provide services to 50 farmers, for instance, the retailer would

need a credit of 50'000 dollars. If we assume that the retailer meets the requirements to be granted a credit by a bank, and that the loan would be paid back in about four months, the cost of the credit would be far lower than 50 percent. In the case of Bancentro Bank, for instance, the annual interest rate is 18 percent and there is a disbursement fee of six percent (cf. table 5). Therefore the cost of the fund would only be 6'000 dollars or twelve percent of the total amount[25]. This would allow for instance to lower the rates for small farmers or to still provide a reasonable return on investment in case that total revenues would amount to 4'000 or 3'000 dollars. Such a product could be offered once a year during the dry season, when micro-irrigation systems yield additional income, and of course for various crops. However, as mentioned in Zbinden and Pong (2005), tomato is the vegetable with the highest value added.

Since the retailer's clients are all small producers living in the same region, they are subject to the same risks, such as inundations or natural disasters. The retailer therefore bears a substantial risk due to the lack of diversification of his clients' activities and the probability of them defaulting at the same time. Therefore this product should include an insurance scheme such as the weather-based insurance offered by the MFI BASIX in India. Indeed, if the credit to the retailer has a cost of only twelve percent, there is a reasonable margin to include the cost of a weather-based insurance, without substantially influencing the final price for small producers. However such insurance products are still poorly developed in Central America.

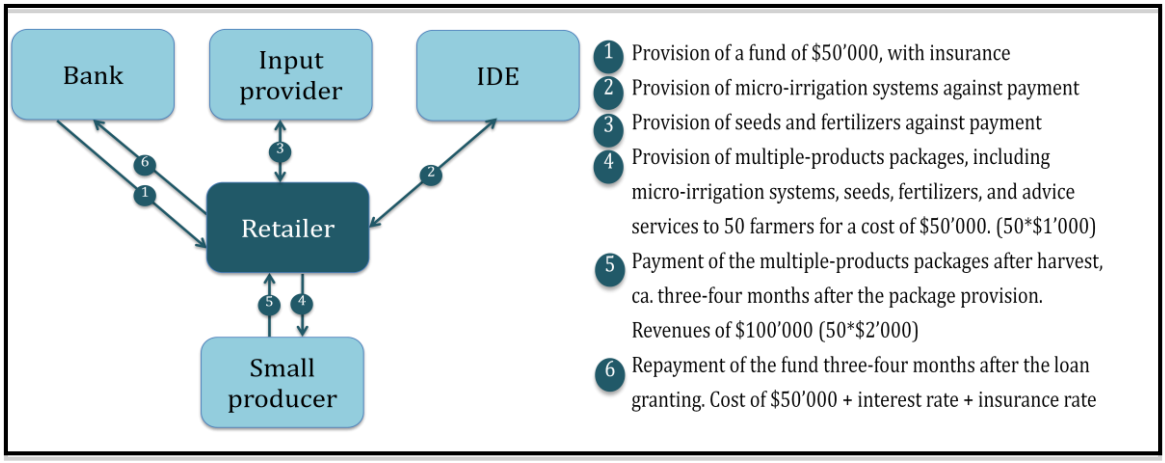

***Figure 6**: Provision of multiple-products packages (Source: own figure)*

7.1.2 MICRO-LEASING

For farmers who do not possess assets to provide as collateral and whose revenues are among the lowest, a partnership for micro-leasing between IDE and a financial institution

[25] $50'000*6% disbursement rate= $3'000. $50'000*(18% interest rates/3 for a period of 1/3 year) = $3'000, which equals to $6'000.

should be considered. However the price of a micro-leasing product should not exceed that of a microloan.

If the micro-irrigation provider offers retailer prices to potential partner MFIs, which are between 16 and 20 percent of the sale price, or at least discount prices, the financial institutions could use the margin to cover a part of the costs of providing micro-leasing. The MFI would therefore act as a retailer, except that it does not have to bear the cost of technical assistance. The experience of IDE with MiCredito and ILOS illustrated in chapter 6 shows that such a product is feasible and that a market exists, however the prices proposed by MiCredito are clearly too high for poor producers.

Nagarajan and Meyer (2005) mention important considerations drawn from leasing experiments in rural areas that should be taken into account. They reported that leasing provides a viable financial option for a large number of rural poor engaged in agriculture, but that it may offer fewer options in remote areas because of high transportation costs and the lack of storing stations for the leased equipment. Also, they note that many legal and tax issues must be resolved before leasing can become an attractive alternative for lease providers. Moreover many questions stay open such as what types of linkages between leasing companies, private investors, donors, and financial institutions can effectively benefit rural clients, or whether and how leasing arrangements can be offered to solidarity groups and communities. Indeed, many issues must be resolved before micro-leasing can become a widely available option for BOP farmers.

7.1.3 SAVINGS

This thesis has shown that the poor need to save and want to do so. However, in order for savings mobilization to become widespread and sustainable in rural areas, it is necessary to reduce transaction costs especially where people are highly dispersed and save in small quantities, because the high cost of managing small savings in remote areas is still a significant obstacle (Nagarajan & Meyer, 2005).

In poor rural areas MBOs are often the only organizations to provide an effective way for households to manage their financial resources, since savers are able to earn a return on their investment by making their capital available to those with viable businesses (Ritchie, 2007). However saving in MBOs is often compulsory and a condition to be granted a microcredit. Notwithstanding, MBOs are essential institutions in promoting savings. The poorest are those who need most to save, because doing so, they may avoid taking a credit and paying the cost associated with it. Indeed, as reported by Banerjee and Duflo (2006, p. 15) "the reason why many of the poor respond so well to microcredit, is not necessarily because it offers them credit, but because once you take a loan and buy something with it,

you have a disciplined way to save — namely, by paying down the loan".

7.2 PRACTICAL IMPLICATIONS

7.2.1 PARTNERSHIPS

MBOs, such as SACCOs, can viably serve remote areas if they can access external sources for excess liquidity, keep costs low, and achieve good governance (Nagarajan & Meyer, 2005). As observed in the case study about the VS&LA model, the linkage of MBOs with formal financial institutions could be very beneficial for community members as they would continue to have the opportunity to save and to borrow little amounts at reasonable costs, but in need of greater amount, the community can borrow the founds to the bank.

Hence be it partnership between a MBO and a formal financial institution, a strategic partnership between a microfinance NGO, a formal financial institution and an unspecialized NGO as in the GAPI case study, or between an microfinance NGO, a service provider and a cooperative of producers as in the micro-leasing case study, partnerships are crucial to tackle poverty issues by making the provision of financial services accessible to the poor. Nagarajan and Meyer (2005) share this idea by declaring that expanding rural finance, reducing costs, and ensuring high loan recovery shall be done through creating more wholesaling and retailing partnerships between agricultural banks, farmer cooperatives, commodity associations, and MFIs.

Indeed, alleviating poverty, by giving the poor the opportunity to raise their income is part of the goal of microfinance, it is as well the purpose of IDE, and it is deep encored in government policies and donors' initiatives.

7.2.2 LEGAL FRAMEWORK

In order to develop appropriate microfinance products for BOP farmers, the legal framework has an important role to play. According to Zeller and Meyer (2002), the challenge in many countries is to develop a framework that regulates microfinance but does not strangle innovation.

Improving MFI sustainability often requires mobilization of savings, but protection for savers becomes an issue when unregulated MFIs begin to mobilize savings in large quantities (Zeller & Meyer, 2002). Indeed, NGOs in most countries are not allowed to collect deposits because only regulated institutions should have the privilege and responsibility to do so (Murdoch, 2000). However, since improving the security of savings is essential to prevent the savings of the poor from being lost through fraud or unsafe practices, some countries have created special categories of licensed, regulated and supervised microfinance institutions (Nagajaran & Meyer, 2005). Nonetheless adding a

large number of MFIs to the responsibilities of regulators might overtax their limited capacity, consequently mixing self-regulation with limited external regulation is likely to better fit the institutional capacity of most developing countries (Zeller & Meyer, 2002).
Also, microfinance NGOs should be encouraged by public policy not to distort financial markets by setting interest rates that do not cover their costs. Those who do not wish to provide financial services on this basis should rather enhance the impact of microfinance for the poorest by providing training, group formation, screening, and other services, rather than lending to them (Zeller & Meyer, 2002).
Many alterations to the regulatory environment for microfinance have occurred in Central America in the last years, showing the commitment of regulators and political authorities to promote microfinance as a commercial activity, however further effort in the improvement of conditions for microfinance regulation and operations are essential (Economist intelligent unit, 2008).

7.2.3 FINANCIAL TRANSPARENCY AND INTEREST RATES

Financial transparency, as the widespread availability of relevant, accurate, timely, and comparable information about the performance of financial institutions, is fundamental for building inclusive financial systems that reach significant scale (Helms, 2006). The right information helps managers make better decisions to improve their institutions and helps private investors and public donors to make informed funding decisions, which provides the resources to fund more rapid growth of financial services for the poor (Helms, 2006). Furthermore, transparency also better informs clients, which could lead to increased competition among MFIs as clients gain knowledge among their options, which should drive prices down as service providers attempt to attract clients with more favorable interest rates (Helms, 2006). Helms and Reille (2006, in Hudon, 2007) confirm this theory by declaring that the two traditional instruments to drive down rates are the transparency of the pricing policy and the development of competition in the sector. Finally, Helms (2006) also found out that financial institutions that fully disclose their financial performance and interest rates are more likely to gain the trust and confidence of their customers.
Hudon (2007) highlights that fair interest rates are essential for the social sustainability of microfinance, which is, beside financial sustainability, the promise of microfinance. However as mentioned before, many authors affirm that the poor demand access to credit independently from interest rate. -Kunt and Murdoch (2009) argue that Yunus's dictum to set interest rates no higher than the cost of capital plus 15 percent would likely worsen outcomes and access for many of the poorest households, though that

could change with future innovations. Yet, Murdoch (2000) defends a different thesis: the ability to pay high interest rates depends on the amount of capital being used and the amount of all other inputs available: it cannot be inferred that because some poor households can pay high rates, poorer households can pay those interest rates as well. Many of those who cannot pay high rates tend to be poorer and harder to reach, and they constitute a large fraction of client bases.

This subchapter makes clear that first for poor farmers living in rural areas, fair interest rates are essential, and prices that are described in chapter 5 are clearly too high because they exceed the costs that an efficient MFI could have. Second there is a clear potential to drive down interest rates in Central America, by making the highly unclear pricing policies more transparent.

8 CONCLUSION

According to the Grameen foundation (www.grameenfoundation.org), two of the most effective tools known to make a real difference in the lives of poor people, especially of those living on less than 1.25 dollar a day, are microfinance and technology. IDE provides one of them: low-cost irrigation technology. This thesis deals with the second tool: how to provide appropriate microfinance services to BOP farmers.

It has been demonstrated that low-cost micro-irrigation systems have an enormous potential in increasing poor farmers' incomes, but this increase in revenue is dependent on the availability of microfinance services, since BOP farmers cannot afford to buy a low-cost irrigation system through a lump sum payment. This thesis has demonstrated, by assessing the microfinance needs of poor farmers desiring to acquire micro-irrigation systems and the supply from microfinance providers in Nicaragua, that the access to appropriate microfinance for poor farmers is limited. By taking into account the financial means and needs of BOP farmers as well as the feasible range of financial products offered by MFIs, this thesis focused on answering the question: which microfinance products and conditions can be offered in order for BOP farmers to afford micro-irrigation systems in Central America.

The results of the field study point out that the lack of collateral, the lack of availability of financial services in rural areas, the high interest rates required by MFIs, as well as the lack of comprehensive solutions are the main obstacles in offering appropriate services to BOP farmers in Nicaragua. In studying four case studies that tried to solve these issues, recommendations have been given for the provision of microfinance services to BOP farmers desiring to acquire low-cost irrigation systems in Central America.

First, the provision of a complete package including micro-irrigation systems, seeds, fertilizers, as well as technical and agronomic consulting to small farmers and eventually a weather-based micro-insurance should be targeted. A credit shall be granted to a micro-irrigation retailer in order for him to create a fund to offer such packages. By providing the irrigation systems together with advice and farming inputs, the retailer insures a greater impact of irrigation systems by small producers.

Second, a micro-leasing agreement between IDE, a financial institution, and small farmers should be considered as a solution for the poorest producers who cannot provide collateral. However, the prices should not exceed those of a microcredit.

Third, saving products are essential for poor farmers, and since those are almost exclusively offered by MBOs, cooperation between MBOs, formal financial institutions and micro-irrigation providers should be given special attention.

Finally, in order for innovative products and appropriate loan conditions to be provided to BOP farmers in Central America, several implications hold. First partnerships between several types of entities are essential to help BOP farmers raise their incomes and to provide them with innovative appropriate products. This has been highlighted in the four described case studies, where MFIs have collaborated with NGOs, MBOs, technologies' providers, and/or formal financial institutions.

Also, the legal framework and the capacity of MFIs to offer fair interest rates have a major role to play in order for MFIs to be able to offer appropriate products to BOP farmers. "The gravest risks to sustainable financing for agriculture often come not from inherent business risks or the inability of financial institutions to design profitable financial products for the rural population, but rather from misguided government interventions such as subsidized interest rates and lack of or non-enforcement of appropriate rules and regulations. Conversely, an enabling environment and legal framework, enforcement of regulations, and a supportive rural infrastructure would eventually lead to lower but sustainable interest rates by reducing transaction costs and risks and increasing competition. All this would contribute immensely to making sustainable access to finance a reality" (Kloeppinger-Todd & Sharma, 2010).

Hence, helping the poor raising their incomes through appropriate technologies and financial products is a shared responsibility. As declared by Prahalad (2009, p.28), a "collaboration between the poor, civil society organizations, governments, and large firms can create the largest and fastest-growing markets in the world. Large-scale and wide-spread entrepreneurship is at the heart of the solution to poverty".

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APPENDIX

APPENDIX A: QUESTIONNAIRES FOR INTERVIEWS

QUESTIONNAIRE FOR SMALL PRODUCERS

(These questions were asked to small producers in Nicaragua during demonstrations of micro-irrigation systems)

General questions:

1. Where do you live?
2. How many children do you have?
3. What type of crops do you grow?
4. What size is the land area you own? And the land area you grow?
5. Do you own a micro-irrigation system? If yes, which size?

(If (s)he already owns an irrigation system)

6. How much did you pay for the irrigation system?
7. Does it work well?
8. What is the major problem associated with the irrigation system?
9. How did you learn about IDEAL? (Friends, cooperatives,...)
10. Why did you choose IDEAL micro-irrigation systems?

11. Are you interested in IDE irrigation systems? If yes, which size?
12. Do you earn enough to live with your farming activities?
13. How much do you earn with your farming activities?

Financing:

14. How did you or would you pay for the irrigation system? (Saving, credit, family)
15. Was it/would it be difficult to find financing?
16. Would you need financial help?
17. Do you think that financing problem prevents small producers from buying an irrigation system?
18. What is your opinion about microcredit?
19. Is it difficult to be granted a microcredit?
20. What do you think of group microcredit?
21. Do you know other methods of financial help?
22. If you would have had more money, would you have chose another irrigation system?

QUESTIONNAIRE FOR MICROFINANCE INSTITUTIONS

1- What is the main objective/focus of the institution? (Social vs. financial sustainability)
2- What is the size of the institution? (Number of clients, employees, credit funds,…)
3- What are your typical clients? (Rural/urban, women/men, agriculture/commerce,…)
4- Do you have a preference in offering loans to women? Why (not)?
5- What are the microfinance products you offer beside microcredit?
6- What are the different microcredit products you offer?
7- Do you offer services accompanying microcredit? Which ones? (capacity building, financial education,…)
8- How important are these types of services in ensuring the repayment of the credit?
9- What is the average loan size you grant? And the minimum amount?
10- What is the smallest loan amount that could be granted by a MFI, that covers its costs?
11- What is the interest rate for your smallest loan? Are there additional fees for clients? Which ones?
12- What are the loan terms? (Frequency of installments)
13- What type of collateral do you require from your clients?
14- Do you grant microcredit without collateral?
15- Do you offer group credit? Which is the percentage of group credit?
16- What is the major cost in offering microcredit?
17- What other type of microfinance products do you know? Do you consider offering them? Why (not)?
18- What is the major cause to refuse clients?
19- Are there many clients who do not manage to pay back their loans on time? If yes, for which reasons? What type of credit do they have? (Group credit? Loan amount?)
20- Does the "microcredit policy" following the "no pago" movement and its support by the president have consequences on your institutions?
21- Do you accept new clients?
22- Do you think that there exist people needing a microcredit inferior to $50?
23- If you think so, are you interested in such clients? If you don't, do you think there are institutions serving this type of persons?
24- Would a poor farmer needing a microcredit for a micro-irrigation system be an interesting client for you?
25- Would you be interested in cooperating with IDE to offer financial services to its clients?
26- In the case of a cooperation with IDE, could you offer preferential condition?

APPENDIX B: REPORT OF THE FIELD STUDY

MICROFINANCE PRODUCTS FOR SMALL PRODUCERS IN NICARAGUA

THROUGH WHICH MICROFINANCE INSTRUMENTS CAN SMALL PRODUCERS IN NICARAGUA ACCESS IDE MICRO-IRRIGATION SYSTEMS?

Report for IDE (International Development Enterprises)

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January 2011

ABSTRACT

The objective of this study is to find out which microfinance products and conditions can be offered by microfinance providers in order for poor farmers in Nicaragua to be able to acquire IDE irrigation systems. IDE micro-irrigation systems target the poorest farmers, however most microfinance products are not available for this target group or are too costly.

During a three months field research in Nicaragua, 39 interviews were carried out throughout the country. Nine farmers using or interested in using IDE irrigation systems were interviewed as well as 25 microfinance providers serving the rural sector (banks, NGOs specialized in microfinance, cooperatives and unspecialized NGOs). Furthermore five interviews were conducted with persons belonging to programs or organizations active in the microfinance environment.

The results of the interviews with farmers show that they are all interested in acquiring IDE micro-irrigation systems and all affirm that they need financial help in order to do so but most of them have difficulty to get access to it because of the lack of collateral required by microfinance institutions, the high costs of microcredit and the lack of supply in rural areas.

The results of the interviews with microfinance providers confirm that there is a reasonable microfinance offer for small producers. Furthermore most institutions are interested in collaborating with IDE to provide microfinance for IDE's customers. However the prices of such products are relatively high.

The most common instrument offered by microfinance providers is microcredit. The prices of a one-year 100 dollars microcredit required by NGOs specialized in microfinance are between 24 percent and 51 percent of the value of the credit. NGOs and cooperatives have lower costs, however they are often highly dependent on external donors. Furthermore, microcredit mostly requires collateral that the poorest farmers are not able to provide.

To outweigh the lack of collateral required for the granting of a microcredit, a **micro-leasing** product is being developed. The asset is bought by a Microfinance Institution (MFI) and rented to the farmers with a buying option at the end of the renting period. The same product serves as collateral, which allows it to be accessible for the poorest producers. Only one institution (FDL) offers it while IDE

is in negotiation with another institution (MiCredito) for a micro-leasing agreement. However such a product can also have high costs. MiCredito requires a surplus between 38 and 64 percent of the price of the micro-irrigation system.

Taking into account those findings, this report gives IDE the following recommendations to make microfinance accessible for its customers:

1. **Microcredit**: For farmers who are able to provide collateral, IDE should collaborate with a MFI providing microcredit, however with a maximum annual cost of 30 percent, which represents the costs of an efficient MFI. This report proposes IDE the five following MFIs, which as well showed interest in collaborating with IDE: Fundacion 4i2000, FDL, AFODENIC, FJN and Prestanic.
2. **Microleasing**: For farmers who do not have any asset to provide as collateral and whose revenues are among the lowest, this report recommends IDE a partnership for micro-leasing, which should have a lower price than a microcredit. Therefore I recommend IDE to renegotiate the micro-leasing price with MiCredito. Then it should seek to collaborate with FDL who already has experience with micro-leasing and finally with Fundacion 4i2000, who showed great interest in this product.
3. **Savings**: IDE should support saving initiatives and further explore possibilities to collaborate with credit and saving cooperatives that require their members to save in order to be granted a microcredit. This would make the credit cheaper and make farmers aware that a credit has a price that could to some extent be avoided.

Table of Contents

1. INTRODUCTION

According to the Grameen foundation[26], two of the most effective tools known to make a real difference in the lives of poor people, especially those living on less than 1.25 dollar a day, are microfinance and technology. IDE (International Development Enterprises) provides one of them: low cost micro-irrigation technology. The topic of this report deals with the second tool: how to provide access to microfinance for small producers. IDE irrigation systems allow poor farmers to clearly increase their revenues. However they cannot afford to buy an irrigation system with a lump sum payment and therefore need microfinance.

The objective of this study is to find out microfinance instruments and microcredit conditions that allow small producers in Nicaragua to finance IDE irrigation systems. As IDE micro-irrigation systems target poor farmers - they are low cost due to their simple innovative technology - most microfinance products are not available for such low amounts or are too costly, which makes microcredit barely affordable for IDE customers.

This report consists eight parts. After the introduction, the second part provides a description of the specificities to take into account when offering microfinance to IDE customers. The third part gives an overview of the microfinance market in Nicaragua. The forth part includes the results of the interviews with IDE current and/or potential customers about their microfinance knowledge, needs and access. In the fifth part, the results of the interviews with microfinance providers about microcredit conditions that could be offered to IDE customers are presented as well as their readiness to collaborate with IDE. The sixth part consists in other microfinance products than microcredit targeting poor farmers on the Nicaraguan market. The seventh part gives recommendations to IDE in terms of how it should approach a collaboration with microfinance providers to offer microfinance products to its customers. Finally the report ends with a conclusion.

During a three-months field research in Nicaragua, 39 interviews were carried out throughout the country (Annex 1). From the demand side, nine farmers using or interested in using IDE irrigation systems were interviewed. From the offer side, interviews have been conducted with two banks, 12 NGOs specialized in

[26] http://www.grameenfoundation.org/what-we-do

microfinance, four unspecialized cooperatives, two credit and saving cooperatives as well as five Non Governmental Organizations (NGOs) providing microfinance products among other services. Finally five interviews have also been conducted with persons belonging to programs or organizations active in the microfinance environment.

2. MICROFINANCE FOR IDE PRODUCTS

IDE significantly increases the income of poor rural farmers by providing low-cost access to water and effective markets. It creates affordable micro-irrigation technologies to help small-plot farmers intensify their agriculture and maximize earnings from their small land holdings[27]. In Nicaragua, IDE commercializes micro-irrigation systems for areas from 20 m^2 to one manzana (about 7'000 m^2) for 15 to 650 dollars and treadle pumps for 130 dollars. This implies the two following obstacles regarding the access to microfinance:

1. Microfinance products must be available in rural areas, which is the least profitable market for microfinance providers and therefore the offer of rural microfinance is scarcer. The main reasons are the following:
    - There is a greater exposure to systematic risks such as droughts, floods and variation in commodity prices.
    - The clientele is dispersed which causes higher transaction costs.
    - The production cycles are rigid; farmers only generate income after the harvest, which means that microfinance providers cannot collect money monthly.
2. IDE customers might need very small credits, from 15 to 650 dollars. Those credits - especially the ones between 15 and 200 dollars - have higher costs for microfinance institutions, because they require the same amount of work than larger credits for lower revenues.

For these reasons, microfinance products are less available and more costly for IDE target group.

IDE's objective is to allow poor producers to increase their income. It has been shown that by using IDE micro-irrigation systems, producers can have one

[27] Annex 2 and www.ideorg.org

additional harvest per year in vegetables and higher yields in beans, corn or other crops. In order to be able to afford the tool that will allow them to increase their income but also in order not to loose the potential income increase generated by the use of a micro-irrigation system by having to repay an expensive microcredit, small producers clearly need innovative microfinance products adapted to their purchasing power.

3. MICROFINANCE MARKET IN NICARAGUA

3.1. General situation

In March 2008, a politically motivated group of producers, merchants and micro-entrepreneurs violently demonstrated in the North of Nicaragua against the high interest and default rates required by microcredit institutions and decided not to pay back their credits. The Nicaraguan President Daniel Ortega publicly gave them its support. The leaders of this group called "No pago" movement eventually demanded that the Congress approves a Moratorium Law to give debtors a ten-year amortization period with interest rates that do not exceed 8 percent a year with a five year credit freeze as a condition to stop harassment of the microfinance industry. This condition was unacceptable for microfinance institutions as their operative costs clearly exceed this amount. Eventually concessions from both sides were made, however no decision was made to solve the problem. The "no pago" movement and the lack of involvement of the government to find a solution created a crisis in the Nicaraguan microfinance market. Foreign fund providers drew back from the Nicaraguan market or asked for higher interest rates. This and the worldwide financial crisis created a huge downturn in the Nicaraguan microfinance market, causing the liquidation of the biggest microfinance institution in Nicaragua (BANEX) and the downsizing of various MFIs. Some of them do not accept new clients anymore or closed their least profitable branch, which is in the majority of cases the rural one. However the microfinance market is slowly recovering and microfinance providers are again confident in the future.

3.2. Microfinance providers

This paper identifies five groups of microfinance providers that could offer products to IDE target group in Nicaragua: NGOs specialized in microfinance, banks, credit and saving cooperatives, unspecialized cooperatives and unspecialized NGOs.

3.2.1. NGOs specialized in microfinance

Specialized NGOs are the main microfinance institutions (MFIs) as they specialize in offering microfinance products. ASOMIF, the Nicaraguan association of microfinance institutions, counts 18[28] non-governmental organizations over 20 members. These 18 NGOs have their benefits reinvested in the organization. They aim at being financially sustainable and at gradually decreasing the dependence from external donations. These institutions are unregulated, they are not authorized and supervised by the bank superintendence and not authorized to accept deposits.

The 20 members of ASOMIF were contacted in order to find out if they have microfinance products adapted to IDE target group (Table 1). Four members communicated that they do not provide microcredit to the rural sector, one institution refused the interview due to a lack of time, and four specialized NGOs were located too far away for an interview. As a result, 11 interviews were carried out with microfinance NGOs associated to ASOMIF, and one interview with the NGO Micredito, which is in the process of being an ASOMIF member.

	ACODEP	ADIM	AFODENIC	ASODERI	CEPRODEL	CSM 20 DE ABRIL	4i -2000	FJN	LEON 2000	FDL	FINCA Nic	CAPITAL	FODEM	FUDEMI	FUNDENUSE	PANA PANA	FUNDESER	PRESTANIC	PRODESA	PROMUJER
Interviewed	x	x	x		x		x	x		x	x			x	x			x		
No rural credit									x			x	x							x
Refusal																	x			
Located far away				x		x										x			x	

Table 1: ASOMIF members interviewed

[28] ASOMIF also counts a cooperative as a member (CSM 20 de Abril) and a regulated financial institution (Financia Capital).

3.2.2. Banks

Banks are regulated financial institutions that are authorized and supervised by the bank superintendence. They collect deposits from the public and give loans with these funds.

The main banks in Nicaragua were contacted to find out if they offer microcredit for small producers. Only two of the six contacted banks offer credit for the rural sector under 5'000 dollars: Produzcamos, a rural state bank and Bancentro. However, neither of both grants credits under 1'000 dollars.

3.2.3. Credit and saving cooperatives

Credit and saving cooperatives are organizations that offer primarily financial services to their members, which are the owners of the institution.

Although there is a reasonable number of saving and credit cooperatives in Nicaragua, the tradition for cooperatives is weaker than in neighbor countries and they are said to be involved in corruption. Moreover, they have a higher default rate than other institutions.

Two credit and saving cooperatives have been interviewed: Caruna Caja Rural, which is financed by the state and Iaguei, a private cooperative.

3.2.4. Unspecialized cooperatives

This category includes multi-sector cooperatives that offer credit as an additional service to their main services, which mostly consist in production support, collecting and commercialization of the harvest. Rather than cooperatives themselves, the four entities that have been interviewed are unions or associations of several cooperatives.

Two of the interviewed unions of cooperatives work exclusively in the coffee sector: UCPCO and UCASUMAL, whereas Aldea Global is active in various sectors such as coffee, bean, corn and fresh products and Ilos mostly in beans and corn.

3.2.5. Unspecialized Non Governmental Organizations

Unspecialized NGOs are non-profit organizations, which, in opposition to NGOs specialized in microfinance, do not specialize on providing microfinance products but do it additionally to other services.

Five NGOs have been interviewed. They focus on rural development (ADDAC and PAC), on building new models for rural and urban development (Nitlapan), on the development of communities with special focus on the environment (La Cuculmeca) and on the empowerment of women having suffered violence or illness (Anfam Credito).

MFIs	Banks	Credit&saving cooperatives	Cooperatives	NGOs	Other
ACODEP ADIM AFODENIC CEPRODEL Fund. 4i2000 Fund. Jose Nieborowski (FJN) FDL FINCA –Nic FUDEMI FUNDENUSE MICREDITO PRESTANIC	Produzcamos BANCENTRO	CARUNA Caja Rural IAGUEI	Aldea Global ILOS UCASUMAL UCPCO	ANFAM Credito ADDAC Cuculmeca NITLAPAN PAC	ASOMIF BANSOL KIVA PROMIFIN PYME Rural

3.2.6.Other actors

When considering the microfinance market in Nicaragua, several organizations or development programs do not provide directly microcredit to the end users but foster the microfinance industry and often have highly relevant information about the market. The following entities have been interviewed in order to get a better overview of the Nicaraguan microfinance market:

1. **ASOMIF**, the Nicaraguan association of microfinance institutions, plays an important role in the microfinance sector as it counts most MFIs as members. It aims to create a greater capacity for the financial and administrative management of the microfinance industry in general.
2. **PROMIFIN**, a program aiming at strengthening financial services, was funded by the Swiss Agency for the Cooperation. Its objective is to promote the outreach of financial services for low-income populations.

3. **Kiva** is an NGO that created a website allowing to connect lenders from the first world to borrowers in the third world with the objective of alleviating poverty. Kiva works directly with MFIs in Nicaragua as a fund provider for selected needy customers.
4. **PYME rural** is a program of the governments of Honduras and Nicaragua, sponsored by the Swiss Cooperation in Central America and facilitated by Swisscontact. Its objective is to contribute to generate employment and income for disadvantaged populations in rural areas.
5. **Leónidas Solórzano** is an entrepreneur in the finance sector. He had a business-school training at Harvard specializing in microfinance. He headed the Central American Bank for Economic Integration (CABEI) in 2006. Subsequently he started two businesses in Nicaragua. One of them BANSOL Nicaragua, is a private company which develops financial solutions for development.

Table 2: Organizations interviewed

4. INTERVIEWS RESULTS - FARMERS

Farmers were asked about three different topics:

1. Their needs of micro-irrigation systems and financial help to acquire them
2. Their general knowledge in term of microfinance
3. Their access to microfinance.

4.1. Need for microfinance

The farmers that were interviewed have between ¼ manzana (1750m^2) and 5 manzanas (35'000m^2) cultivating vegetable, beans and/or corn. They are all interested in IDE micro-irrigation systems and none of them think he could afford it without financial help.

4.2. Knowledge about microfinance

The main outcome of the interviews is that small producers do not know much about microfinance. Only two out of the nine interviewed farmers had a previous experience with microfinance institutions, one had a positive experience, the

other a negative one. The positive experience was with Caruna Caja Rural. Caruna is highly subsidized from the state, which allows it to offer lower interest rates. The negative experience was with a non-financial microfinance institution, which according to the producer, had required a total loan price that amounted to 84 percent of the credit value. He has not been able to pay back the credit on time and will never be able to get a microcredit again because he is now registered in a risk central as bad payer.

4.3. Access to microfinance

The producers that had no previous experience with microcredit gave as reason that they did not know about the possibility to ask for a microcredit or that they had no access to microfinance because of the following reasons:

- They do not fulfill the requirements in terms of collateral
- They are living in too remote areas where almost no microfinance institution is present
- The few present microfinance institutions in the rural sector require too high interest rates.

One of the farmer stressed the importance of microcredit: "Microcredit is necessary, but the vision has to change: it mustn't be exploitive for small farmers. Now it is a system that kills small producers". As most farmers do, he identified microfinance as a necessity however not adapted to small producers. Concerning interest rates, only two farmers had an opinion about what is an affordable rate. One said that a 2 percent a month would be fine, while the other one a 30 percent a year but both pretend that such rates do not exist on the rural microfinance market.

5. INTERVIEWS RESULTS – PROVIDERS

The five types of identified providers of microfinance services have been asked about four different topics:

1. Their microcredit products and interest rates for the rural sector
2. The requirements applying to borrowers
3. Further financial products addressed to small producers (Part 6).

4. Their interest in micro-irrigation products and in a potential collaboration with IDE.

5.1. NGOs specialized in microfinance

5.1.1. Microcredit product

For the rural sector, three different credit methodologies can be identified:

1. The individual credit is offered by all interviewed specialized NGOs.
2. The group credit usually includes three to five, eight or ten persons according to institutions. All group members respond for each other but the credit is granted to the individual. The credit amounts are usually smaller than by individual credits. Eight from the 12 interviewed specialized NGOs offer it (Table 3).
3. The communal bank credit usually includes 12 to 30 members. It targets the poorest producers with credit amounts from $40. The credit is granted to the bank, not to the individual. Only two interviewed institutions, Prestanic and Fundacion 4i2000 offer it in selected areas.

From the 12 interviewed specialized NGOs, seven offer a minimum loan amount between 50 and 100 dollars, the five other ones between 150 and 300 dollars. For the seven institutions offering 100-dollars microcredits, the price of a 100 dollars credit for one year[29] amounts between 28 and 51 percent of the credit value. For a 300 dollars microcredit, the 12 specialized NGOs have prices between 24 and 44.6 percent of the credit value.

MFIs have to comply with the central bank interest rate, which varies constantly but adds up to 16-18 percent a year. Additionally they have a commission tax, which is expressed in a monthly rate or in a one-time rate at the disbursement. Furthermore legal fees to publicly write the contract have to be taken into account, which amount between 5 and 20 dollars for the smallest credits. Some MFIs add as well a mandatory life insurance between 1 percent of the credit value to 2 dollars per month. Finally for microcredit in cordobas, the local

[29] In order to be able to compare the credit prices of the different institutions, this report calculates the prices for a one-year credit even if most credit have to be reimbursed in less than one year. Similarly it calculates the costs only for a $100 and a $300 credit. It does so because some institutions include all their costs in an annual rate while other have a composition of a fix fee per contract, a monthly interest rate and a rate at the disbursement. Therefore the cost for a one-year $100 or $300 credit is not always equal to the annual interest rate (the annual rate might be smaller for a longer period or a bigger credit for some institutions while it can stay equal for other institutions that include all their costs in an annual rate).

currency, some institutions require a devaluation tax. All these costs are taken into account in Table 3.

The microfinance market in Nicaragua clearly lacks transparency about credit prices and microfinance institutions do not reveal easily price information. Therefore the figures in Table 3 are an approximation of the real credit prices and the rates might decrease or increase if the value of the credit increases, as some MFIs express all their costs in an annual rate while other have a composition of fix fees, a monthly rate and a rate at the disbursement.

Institution	Acodep	ADIM	Afodenic	Ceprodel	FDL	FincaNic	FJN	Fudemi	4i2000	Fundenuse	Micredito	Prestanic
Individual credit	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Min. indiv. credit	$100	$300	$300	$100	$100	$50	$300	$200	$100	$50	$100	$150
Cost 1-year $100 credit	$: 37% CS: 51%			47.0%	28.0%	39.6%			30.0%	34.6%	45.6%	28.0%
Cost 1-year $300 credit	$:30.3% CS: 44%	39.9%	24.0%	35.9%	28.0%	39.6%	26.6%	26.0%	30.0%	35.0%	45.6%	28.0%
Group credit	yes	yes	no	no	yes	yes	no	yes	yes	yes	yes	no
Min group credit	$100	$140	no	no	$100	$50	no	$200	$40	$50	$50	$150
Cost 1 year $100 credit	$: 37% CS: 51%	42.40%			28.0%	39.6%		26.0%	30.0%	34.6%	45.6%	28.0%
Communal bank credit	no	no	no	no	no	no	no	no	no	no	no	yes

Table 3 :Interviewed NGOs specialized in microfinance: credit methodology, credit cost and minimum credit amount

The average operating costs of a microfinance institution are about 30 percent according to ASOMIF and PROMIFIN. The cost of their funds is about 11-12 percent, their operative costs are about 10 percent and an additional 8 percent is added up for provisional and other costs. However it has to be mentioned that the prices for rural credits are often subsidized by the prices of commercial credits, which allows some MFIs to offer rural microcredit at a rate of 24 to 30 percent. This shows that NGOs specialized in microfinance should be able to offer microcredit at a sustainable rate of 30 percent, yet only half of them are doing so.

5.1.2. Requirements

Farmers have to meet certain requirements in order to get a microcredit from an NGO specialized in microfinance. These requisites vary according to institutions and the value of the credit.

However the following requirements do almost always apply:

- The producer has to reside close to an office branch
- (S)he has to be in possession of an identity card
- (S)he has to be between 21 and 65 of age (or 66)
- (S)he must have an established business for at least one year, mostly two
- (S)he must not be registered in any negative clients databases or in a risk central, which means that (s)he must never have been in default in any other institutions
- (S)he must be moral solvent, which is evaluated during the interview with the farmer and his/her neighborhood
- (S)he has to present collaterals with a value from one time the credit value to one and a half time, which can take the form of household furniture, machines, computer…
- (S)he must have a guarantor, who also has to meet certain requirements

In some cases the following requirements also apply:

- For bigger credits, a mortgage is needed (usually not under $2000)
- The farmer must be owner of the property
- (S)he must present a receipt of a water and electricity bill

For group and communal bank credits, there are in most cases fewer requirements. Sometimes (in most cases for communal bank credit) no other guarantee is needed than the required age, an identity card, moral solvency and the co-responsibility for the other group members; however in most cases group credits also require a collateral of one time the value of the credit.

According to most MFIs, the main reason for refusing clients is their bad credit history or their overindebtedness, i.e. their registration in a risk central. The lack of collateral was seldom mentioned as a reason for refusal.

5.1.3. Interest in cooperation

All interviewed specialized NGOs were interested in cooperating with IDE, four of them strongly interested (MiCredito, 4i2000, Afodenic, FDL). However three institutions (FJN, Ceprodel, MiCredito) mentioned that technical assistance from IDE's side is a crucial element as poor farmers have little education and therefore

technicians must explain them in details how everything works and always be ready to visit them.

5.2.Banks

5.2.1. Microcredit product

The two banks offering credits to the rural sector were interviewed. However, they do not provide microcredit under 1'000 dollars, which means that they would not attend IDE target group directly. Their credit cost for one year is clearly lower: from 12 percent for Produzcamos (11 percent annually plus 1 percent at the disbursement) to 24 percent for Bancentro (18 percent annually plus 6 percent at the disbursement).

	Produzcamos	Bancentro
Cost 1 year $100 credit	12%	24%
Min Credit	$1000	$1000

Table 4: Interviewed banks: Credit cost and minimum credit amount

5.2.2. Requirements

The requirements that apply for banks' clients are basically the same than those that apply for MFIs' customers however banks also demand additional requirements such as commercial and personal references, an investment and business plan, a receipt of a paid electricity and water bill and a warranty deed. Also, similar requirements apply to the guarantor. Last but not least mortgages are required for higher credits (from 2'500 dollars for Produzcamos and 5000 dollars for Bancentro).

5.2.3.Interest in cooperation

Cooperating with banks could be an option for IDE to provide credits to wealthier farmers or to a cooperative that wants to buy several irrigation systems, however the requirements for borrowers are harder to meet, which makes it unaffordable for cooperatives of poor farmers.

However for farmers or cooperatives that can fulfill the requirements, banks are an interesting option due to their clearly lower credit prices. Both banks were

interested in IDE products, however none of them work with groups, therefore in case a cooperative wants to buy several irrigation systems, the credit would have to be granted to the cooperative head.

Furthermore, Bancentro said it might be interested in a cooperation if IDE would be guarantor of the microcredit. However this would be a risky option for IDE as if the farmer knows that IDE stays behind him, his motivation to pay back the credit may decrease.

5.3. Credit and saving cooperatives

5.3.1. Microcredit product

One of both interviewed credit and saving cooperative is Caruna Caja National. It is an institution subsidized by the state. It offers annual interest rates of 8 percent for the agriculture with a 5 percent deduction for the commission, 3 percent of which goes on the borrower's saving account. This means that for a one-year 100 dollars microcredit, the price of the credit is 10 dollars, which is by far the best alternative for small producers. The other cooperative, Iaguei, offers credit at 42 percent, which is in the upper range of MFIs prices.

	Caruna	Iaguei
Cost 1 year $100 credit	10%	42%
Min Credit	$140	$100

Table 5: Credit and saving cooperatives: Credit cost and minimum credit amount

5.3.2. Requirements

The requirements to get a microcredit in a credit and saving cooperative are the following (additionally to the membership to the cooperative):

- The borrower and the guarantor must present an identity card
- The producer must show an investment plan
- (S)he must have a proof of a regular income
- (S)he needs a guarantor
- (S)he must provide collateral (<$2000: commercial; >$2000: mortgage).

Furthermore, Caruna is known to require political party adherence from its members, which could be neither confirmed nor refuted during the interview.

5.3.3. Interest in cooperation

None of both cooperatives showed interest in cooperating with IDE: Iaguei because the majority of its customer does not need IDE products, but Caruna Caja rural did not mention any reason. The state cooperative does not want to publish financial statements anymore since it is known to be financed by the "Venezuelan cooperation" (50 percent of the oil invoices from Venezuela to Nicaragua is directly invested in Caruna, half of them as credit, half of them in a fund managed by Caruna)[30]. That is the reason why it is not a member of ASOMIF anymore. This could as well be a possible explanation for not wanting to cooperate with IDE.

However credit and savings cooperatives could be an interesting option for a potential collaboration because, as their names say, they are also saving cooperatives that encourage their members to save before granting them a credit.

5.4. Unspecialized cooperatives

5.4.1. Microcredit product

The four interviewed cooperatives offer microcredit to their members at a much more attractive price than MFIs. The total price of a one-year 100 dollars credit ranges from 11.4 to 24 percent. They also tend to offer smaller minimum credits. Therefore cooperatives represent a good option for small producers to get a microcredit. However the funds of cooperatives that allow them to offer credits under the real costs often depend from foreign donors and rotation funds, which might be limited in time or withdrawn from one year to the other.

	Ilos	Aldea Global	UCPCO	UCASUMAL
Cost 1 year $100 credit	24%	11.4%	18%	14%
Min Credit	$50	$120	$50	$100

Tabl

e 6: Interviewed cooperatives: Credit cost and minimum credit amount

[30] *www.gtai.de/ext/anlagen/PubAnlage_8661.pdf*

5.4.2. Requirements

In addition to being a member of the cooperative, a producer also has to fulfill certain requirements in order to be granted a microcredit. However those requirements are not always well defined and less strict than by other microcredit providers.

Producers usually need collateral, a certain number of years in the cooperative (one to three), moral solvency, the capacity to pay (according to their production), a working plan and the previous agreement of the cooperative committee before the definitive agreement of the cooperative union. Members in the cooperatives usually know each other, therefore subjective factors such as the reputation of the borrower have a greater relevance than they do by other providers and might sometimes compensate for other unfilled requirements.

5.4.3. Interest in cooperation

Unions of cooperatives can finance the acquisition of a micro-irrigation system for their members only to a certain extent. Their funds are limited and they are always looking for new sources of financing. Therefore they would have more interest in a cooperation with IDE if at the same time they can have access to external financing.

For example, IDE is now in negotiation for a micro-leasing agreement with the cooperatives union Ilos and the MFI Micredito. Micredito would provide financing for Ilos members to lease IDE irrigation systems. This agreement will be described in part 5.1.

5.5. Unspecialized NGOs

5.5.1. Microcredit product

Finally, unspecialized NGOs offering microcredit usually have lower credit prices, from 15.6 to 21 percent for a one-year 100-dollar credit. However microcredit is only one of the many tools NGOs offer to their beneficiaries. Unspecialized NGOs do not seek to be financially self-sufficient in the first place, as do NGOs specialized in microfinance. Also, we have to consider that unspecialized NGOs' funds might not be sustainable as they depend on foreign donors or rotation funds, which are limited in time. Moreover credits offered by unspecialized NGOs

usually have a greater default rate, as farmers know they will mostly not be registered in risk centrals if they do not reimburse their credit on time.

From the four interviewed NGOs offering microcredit, there is one exception: PAC. PAC requires a price of 45 percent for a one-year 100-dollar credit. This is firstly because it has 20 dollars of fix fees, which strongly increases the price of a 100-dollar credit but decreases as the credit value increases. Secondly, PAC has developed a Financial Services area, whose administration and operation is in line with the standards that rule performance of the non-banking financial institutions.

	Anfam Credito	ADDAC	Cuculmeca	PAC
Cost 1 year $100 credit	15.6%	19%	Max. 21%	45%
Min credit	$150	$150	$50	$50

Table 7: Interviewed NGOs: Credit cost and minimum credit amount

5.5.2. Requirements and interest in cooperation

Farmers usually get a microcredit from an unspecialized NGO it they are beneficiaries of one of the NGO's social projects. The requirements are similar to those for unspecialized cooperatives, however very flexible (with the exception of PAC, which has similar requirements than MFIs).

Similarly NGOs would be interested in a cooperation with IDE only if at the same time they would get external financing for IDE irrigation systems.

6. INTERVIEWS RESULTS: OTHER MICROFINANCE PRODUCTS

6.1. Micro-leasing

6.1.1. Nitlapan experience

In 2004, Nitlapan[31], an institute promoting local development initiatives by providing financial and non-financial services to micro, small and medium businesses, started a cow-renting program.

In this program, small farmers can rent a cow for 0.35 to 0.65 dollar a day, according to the type of cow. They have to give back the cow after one year and

[31] *www.nitlapan.org.ni*

can keep the cow's products: the milk and the calves. Similarly, Nitlapan offers cow renting with a buying option at the end of a three-year period (leasing). The only requirements that farmers have to meet are to have knowledge about how to care for cows or be ready to learn it and to have food, water and shade available for the animal.

This program has been a success, especially because it allows rapid incomes for poor producers, it increases the food security and allows an insertion in the market.

However the farmers are not always able to care well for the cows because they do not always have or produce the necessary forage to feed them. In this case, Nitlapan can as well rent machines for farmers to produce forage.

This program has shown that renting or micro-leasing, i.e. renting with a buying option at the end of the renting period, is a good option when the financial means of the farmers are scarce, when they lack collateral and when the working asset is generating the income, like the cow in this example.

6.1.2.Micro-leasing product

Similarly, for micro-irrigation, the income is partly generated by the asset; the irrigation system, and IDE customers have little collateral to provide, which makes micro-leasing an interesting product for IDE farmers.

A micro-leasing contract is a three-parties agreement:

1. The farmer who makes use of the irrigation system
2. The MFI who buys the irrigation system and leases it to farmers
3. The provider who sells the system to the financial institutions and gives technical assistance to farmers

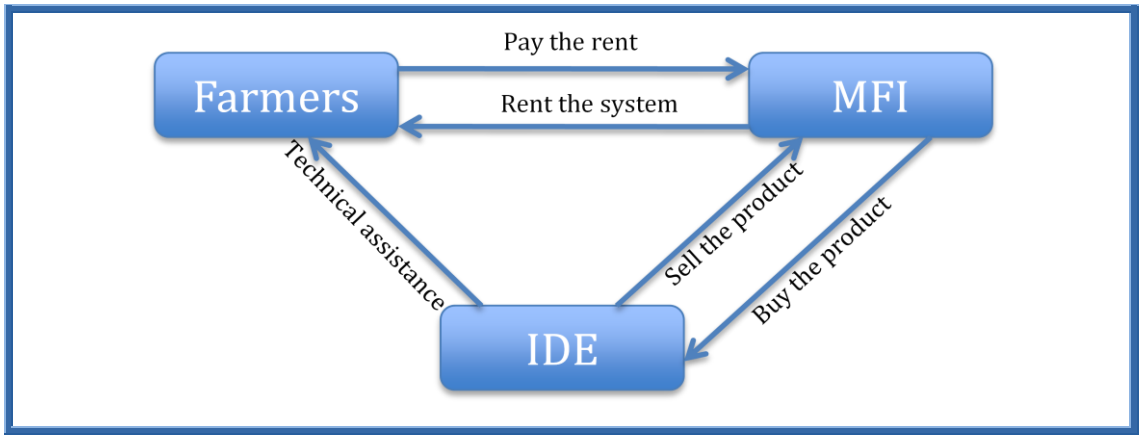


Figure 1: micro-leasing agreement

Micro-leasing has clear advantages for all parties:

- The provider enjoys a greater payment security as the MFI buys him the product
- The MFI introduces a new product and reduces the risk of not getting paid as the equipment belongs to her and can be withdrawn at anytime
- The farmers do not need collateral and can choose to give back the product at any time if they do not need it anymore, if they are not satisfied or if they cannot pay it anymore.

For micro-leasing to be an affordable tool for small producers, the following elements have to be respected:

- Some flexibility should be included in the contract: if a farmer is supposed to pay 10 rates before being able to acquire the system and delays for one of the last rates, the product should not be withdrawn.
- The price of the leasing contract should not be more expensive than the price of a microcredit. The MFI and the provider should collaborate to offer the best alternative for small producers.
- The technical assistance from the provider should not be neglected even if the product is property of the financial institution.

Micro-leasing products in MFIs are not yet developed. One of the reasons for this is the lack of legislation. The law about microfinance proposed by ASOMIF contains a paragraph about micro-leasing, which states that micro-leasing should benefit from the same fiscal advantages than regular leasing. Indeed micro-leasing could be a very good tool for small producers, as the Value Added Tax (IVA) would not have to be paid. Similarly, the legal fees, which apply for the registration of a microcredit, would also drop out.

One of the interviewed MFI (FDL) offers micro-leasing to some of its clients. FDL is able to offer micro-leasing without additional cost because of the quantity discount it becomes from its providers.

6.1.3. Micro-leasing agreement: IDE, MiCredito and Ilos

A second MFI, MiCredito, is in negotiation for a micro-leasing agreement with IDE and the cooperatives union Ilos. This is a pilot project with about 20

producers, members of Ilos. IDE sells the micro-irrigation systems to MiCredito, which leases them to the producers.

IDE is in charge of a pre-selection of the clients, of the delivery and installation of the equipments as well as the technical assistance. The advertisement is task of both MiCredito and IDE while the design of the micro-leasing product, the evaluation and approval of the potential clients and the renting of the micro-irrigation system are tasks of MiCredito.

By designing the product, MiCredito set the following requirements for potential customers:

- The client must be full of age
- (S)he has to be a farmer
- (S)he must present a photocopy of his/her identity card
- The farmer must have twelve months working in the activity for which (s)he requires the micro-irrigation system
- (S)he must not be registered in any risk central or bad payer database
- (S)he must be in the attendance zone of a MiCredito's office
- (S)he has to pay a 5% deposit of the value of the asset
- His/her financial and economic evaluation must be good

The price that MiCredito requires for this product is $30 for the public writing of the contract and the risk central check. Furthermore the price of the leasing goes from 38.3% for a one-year period paying in semester quotes to 63.5% for a two years period paying in annual quotes.

The concept of this micro-leasing product is interesting for small producers lacking collateral, however its price is clearly too high, as small farmers would be better off taking a microcredit.

6.2. Micro-insurance

Micro-insurance allows cancelling the credit in case the borrower dies and gives as well a small amount of money for the funeral. Four of the interviewed institutions declared having micro-insurance as a compulsory part of the microcredit contract. The prices vary from 1 percent of the credit value to 2 dollars a month.

Micro-insurance is a useful product, however having it as a compulsory part of the microcredit makes the credit more expensive. Especially for very small credits, a lower rate with no insurance might be better adapted to the needs of small producers.

Also, ASOMIF mentioned a pilot project about a harvest micro-insurance, but at the time it was only for specified products (coffee and peanuts) and for medium to big producers. With such insurance, as the risks that the farmer does not pay back the credit are lower, the prices of the microcredit could also be lower. Whether it would be advantageous for small producers depends on the cost of the insurance, the extent of the risk of loosing the harvest and finally on the discount obtained on the microcredit.

6.3. Saving

The law does not allow MFIs to accept saving accounts in Nicaragua. ASOMIF is trying to include this possibility in the "microfinance law" it is proposing to the Congress, however the chance for this article to be accepted is very small.

Nonetheless the financial education program supported by Promifin and followed by several MFIs includes saving as one of the three main topics. This program stresses the importance that poor farmers understand that by buying only the necessary and with the discipline of putting money aside, it is possible for most of them to save. It is also essential for them to understand the cost of a credit. In deed, there is a trend for poor farmers to be convinced that they need a credit, without understanding its cost.

Cooperatives are the only institutions providing saving accounts for the poorest farmers. For instance Caruna Caja Rural requires a 5 percent deduction for each credit it gives, 3% of which goes on the saving account of the member.

7. RECOMMENDATIONS FOR IDE

As IDE's purpose is to significantly increase the income of poor farmers by providing low-cost access to water and effective markets, it is important that it is also able to provide or support the provision of a low-cost access to microfinance so that small producers can afford IDE irrigation systems.

This paper gives IDE recommendations regarding three different products for the collaboration with institutions providing microfinance.

7.1. Microcredit: cooperation with MFIs

For farmers who are able to offer collateral or would be able to pay back a credit in a short period of time, I recommend IDE to work with an MFI, which offers a maximum price of 30 percent for a one-year 100-dollar credit. This would include six of the interviewed specialized NGOs: FUDEMI, FDL, 4i2000, FJN, Prestanic and AFODENIC.

FDL, Fundacion 4i2000 and Prestanic all provide group and individual credits with a minimum amount between 100 and 150 dollars. In the case of a cooperation with IDE, it is more probable that the group credit methodology is used because group credits allow smaller credit amounts, because it might be easier to start a collaboration agreement with a group and because the pressure to pay back in a group is higher than for individual credits. Even though, the possibility of individual credit should not be excluded.

AFODENIC and FJN only offer individual credits over 300 dollars. However they both mentioned that they would be ready to discuss the possibility to grant group credits with smaller amounts in the case of a cooperation with IDE.

In the case of an agreement, FJN insisted that IDE should guarantee that small farmers would pay back their credits. FJN is currently focusing on reorganizing its finances after a severe downsizing at the beginning of 2010; therefore it is now very cautious in granting credits. However it is confident about the future and positive about an agreement with IDE.

FUDEMI would be excluded as collaboration partner, since it focuses more on the urban area, with fewer than 10 percent of its clients in the agricultural sector.

Therefore I recommend IDE the three following phases in contacting institutions:

1. Fundacion 4i2000 and FDL should first be contacted as they showed a great interest in cooperating with IDE, they offer group credits and loan amounts under 300 dollars.
2. AFODENIC should then be contacted, since it is ready to discuss its conditions in case of a cooperation with IDE.

3. Finally IDE should contact FJN and Prestanic. FJN is ready to discuss its conditions for IDE customers, however it might need some time to reorganize its finances. Prestanic is interested in the product, however it needs to see how the product works to decide if it could be interested in a cooperation with IDE.

IDE should organize product demonstrations on the field with these institutions and their customers who are interested in micro-irrigation systems, as well as with IDE's customers who need a microcredit. If possible, i.e. if several MFIs have branches close to the same rural communities, they should be invited to the same products demonstration in order to create competition for credit prices and also for small producers to be able to choose between more than one offer.

For a collaboration to be possible, it is essential that IDE provides technical assistance adapted to poor uneducated farmers. IDE must be ready to visit the farmers when they need it, because if they are not able to make the micro-irrigation system work, they will not pay back the microcredit and the MFI will blame IDE.

7.2. Micro-leasing: cooperation with MFIs

For farmers who do not have any asset to use as collateral and whose revenues are among the lowest, I recommend IDE to consider a partnership for micro-leasing, however under consideration of the following elements:

- The price of the micro-leasing product should be lower than that of a microcredit, i.e. under 30 percent of the value of the micro-irrigation system. This could be possible because there should be no registration costs for a micro-leasing. Moreover in case the law about microfinance is accepted and includes the leasing article, the IVA for leased product would drop out, which would lower the costs for producers.
- In order to be able to offer advantageous conditions to farmers, IDE could offer the retailer price to potential partner MFIs that would buy the irrigation system to lease it. This would allow them to cover the cost of the micro-leasing product or at least part of it.

- The micro-leasing contract should be flexible so that if a farmer wants to buy the system after the renting period and delays in paying one of the last rates, the irrigation system should not be taken away.

Therefore I recommend IDE the three following steps concerning a possible micro-leasing agreement:

1. It should negotiate with MiCredito to lower its micro-leasing price. As the micro-leasing agreement and the contact with interested farmers already exist, time and effort would be saved if this agreement is implemented. However IDE should only consider signing the agreement if MiCredito agrees to clearly lower its prices.
2. IDE should contact FDL, which already has experience in micro-leasing and discuss if it would be ready to offer good leasing conditions for IDE customers.
3. IDE should contact Fundacion 4i2000, who showed interest in a micro-leasing product but has no experience in it yet.

7.3. Saving: cooperation with credit and saving cooperatives

IDE should support saving initiatives. The process used by Caruna Caja Rural, in which by granting a microcredit, five percent are deducted, three of which are deposited on the saving account of the client, is a good option to encourage farmers to save. Even if the conditions offered by Caruna Caja Rural are only possible through of state subsidies, other private credit and saving cooperatives could grant a microcredit to their members only if a certain percentage of the credit is available on their saving account. However no suitable partner has yet been found for such a product.

Therefore I recommend IDE to contact other credit and saving cooperatives (the cooperative Union in Matagalpa showed interest in IDE products, but had no time for an interview) and see if such a product is possible.

Product	First step	Second step	Third step
Microcredit	**4i2000 & FDL** **Reasons:** • Reasonable interest rates • Low min. credit amount • Group credit • Great interest in cooperation • 4i2000 is ready to start collaboration now • FDL is by far the bigger institution and has the greater geographic presence	**AFODENIC** **Reasons:** • Reasonable interest rates • Medium min. credit amount but ready to negotiate • No group credit but ready to introduce it for IDE • Great interest in cooperation	**FJN & PRESTANIC** **Reasons:** • Reasonable interest rates • Prestanic: low min. credit amount • FJN: medium min. credit amount but ready to negotiate • Prestanic: group credit • FJN: no group credit but ready to introduce it for IDE • Interest in cooperation only under several conditions • FJN: need time to reorganize its finances
Micro-leasing	**Micredito** **Reasons:** • Agreement already exists but rates are too high **Conditions:** Lower interest rates	**FDL** **Reasons:** • Reasonable interest rates • Experience in micro-leasing • Interest in cooperation	**4i2000** **Reasons:** • Reasonable interest rates • No experience in micro-leasing but interest
Saving	Contact further credit and saving cooperative (incl. Union)	Select cooperatives with reasonable interest rates (under 30%)	Create a new credit product requiring a min. saving amount

Table 8: Recommendations for IDE

8. CONCLUSION

The objective of this study was to find out which microfinance instruments and microcredit conditions could be offered in order for small producers in Nicaragua to be able to acquire IDE micro-irrigation systems.

Some economists argue that microfinance for poor farmers will never be efficient because small rural credits have high costs and the generated incomes by small producers are not large enough to bear the cost of a microcredit. However the use of an IDE micro-irrigation system allows to clearly increase the revenue of small farmers and therefore gives them the opportunity to afford a microcredit. However, the market for microfinance in Nicaragua lacks transparency and regulation. Also, microcredit is mostly very expensive. MFIs offer prices between 24 and 51 percent for a one-year 100-dollar credit. NGOs and cooperatives have lower prices, however they strongly depend on foreign funds.

As an alternative to microcredit, micro-leasing is a good option for small producers who lack the required collateral for a microcredit. However the prices might be higher than those for microcredit as it was shown in the pilot project

for a micro-leasing agreement between IDE, Micredito and the cooperatives union Ilos.

From the demand side, farmers are all interested in acquiring IDE irrigation systems and all affirm to need a microcredit in order to do so. However their knowledge about microcredit is in most cases restricted and their access limited.

Taking into account those findings, this report gives IDE the following recommendations:

1. For farmers who are able to provide collateral, IDE should work with a MFI providing microcredit. However a yearly price of 30 percent, representing the costs of a MFI, should not be exceeded. Therefore it should first collaborate with Fundacion 4i2000 and FDL because they offer group credits and smaller minimum credits. Subsequently, it should seek cooperation with AFODENIC and finally with FJN and Prestanic, who all offer prices under 30 percent.
2. For farmers who do not have any asset to provide as collateral and whose revenues are among the lowest, I recommend IDE a partnership for micro-leasing, which should have lower costs than a microcredit and be flexible. IDE could offer the retailer price to potential partner MFIs, who would transfer the saving on the farmers. The experience of IDE with MiCredito and Ilos shows that such a product is feasible and that a market exists; however the prices proposed by MiCredito are too high. Therefore I first recommend IDE to negotiate a reasonable price with MiCredito. Then IDE should try to contact FDL who already has experience with micro-leasing and finally Fundacion 4i2000 who showed interest in the product.
3. Last but not least IDE should strongly support saving initiatives and further explore possibilities to work together with cooperatives that require their members to save money in order to get a microcredit.

If we want to change things, we have to change the way people think. Poor farmers know very little about microfinance however they are convinced that they need it at any price. In most cases they do need it, but they also need to understand that credit might have a price they cannot afford. Therefore small producers need to be informed about the advantages of saving and about the

costs of a microcredit. When it turns out that they really need a microcredit, they should be advised on the institutions that have products matching their financial needs. That is where IDE could play an important role.

ANNEX

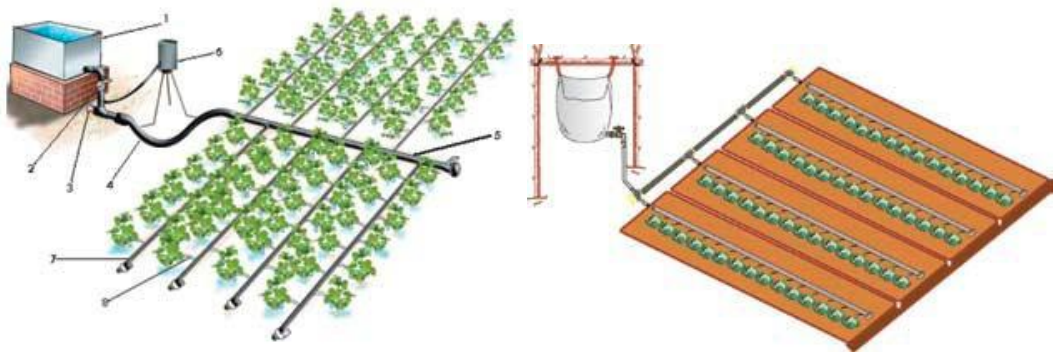
ANNEX 1: CONTACT DETAILS

Institutions	Contact	Place	Date	Remarks	Web
BANCENTRO	Juan Moreno	Matagapla	15 Oct	No credit under $1000	www.bancentro.com.ni
BANPRO	Denis A. Duarte Lacayo	Managua	18 Nov	No credit under $6'000	www.banpro.com.ni
Produzcamos	Maria Johanna Flores	Matagalpa	2 Dec	No credit under $1000	www.bfp.com.ni
ACODEP	Rodrigo José Lopez Sanchez	Matagalpa	2 Dec		www.acodep.org.ni
AFODENIC	Francisco Montoya G	Managua	15 Nov		www.afodenic.com
CEPRODEL	José Raúl López	Managua	12 Nov		www.ceprodel.org.ni
FDL	Mario Flores	Managua	14 dec		www.fdl.org.ni
FINCA-NIC	Patricia Ponse	Matagalpa	3 Dec		www.fincanicaragua.com.ni
Financia Capital	Marina Cabrera	Managua	15 Dec	No credit under $1000 and little for agriculture	n.a.
FUDEMI	Carla Salgado	Managua	14 dec		n.a.
Fundación 4i-2000	Maria Julia Palacios	Managua	26 Nov		n.a.
Fundacion Jose Nieborowski	Marlon Perez Miranda	Managua	12 Nov		www.fjn.org.ni
FUNDENUSE	Fernando Solis Martinez	Matagalpa	2 Dec		n.a.
MICREDITO	Veronica Balladares and S. Bolanos	Managua	1 Oct & 18 Nov		www.micredito.com.ni
PRESTANIC	Ing Abinadad GuardianBenavide	Matagalpa	3 Dec		www.prestanic.org.ni
ADIM	Javier Flores	Managua	12 Nov		www.adim.org.ni
CARUNA Caja Rural Nacional, R.L	Martha Vado	Managua	23 Nov		n.a.
Cooperativa de ahorro y credito financiera IAGUEI, R.	Velia Reyes		17 Dec	Very few credit for agriculture	n.a.
Asociación Aldea Global Jinotega	Marco Castellon	Jinotega	3 Nov		n.a.
Unión de Cooperativas Productores de Café Orgánico	Jhyson Moreno	Esteli	4 Nov		www.ucpcorl.com
Ilos	Marvin	Leon	30 nov		n.a.
UCASUMAL	Luis Primitivo Garcia	Jinotega	3 Nov		n.a.
NITLAPAN	Alfredo Ruiz	Managua	29 Nov		www.nitlapan.org.ni
PAC	Huber Sequira	Matagalpa	3 Nov		www.apac.org.ni
La Cuculmeca					www.cuculmeca.org
ANFAM	Carla Brene	Managua	29 Nov	Few credits for the agriculture	n.a.
ADDAC	Guiseppe Aieta	Matagalpa	3 Dec		www.addac.org.ni
ASOMIF	Alfredo Alaniz	Managua	20 Dec		www.asomif.org
Rural PYME	Rudolf Krummenacher	Managua	14 Dec		http://www.pymerural.org
KIVA	Mr. Cameron	Managua	16. Nov		www.kiva.org
PROMIFIN	Perla Rosales	Managua	12 Oct		www.promifin-cosude.org
Bansol	Leonidas Solorzano	Managua	15 Dec		www.bansol.net/inicio.php

ANNEX 2: IDE DRIP MICRO-IRRIGATION SYSTEM

IDE lowered the cost of drip irrigation systems by replacing conventional emitters with holes and microtubes, shifting water distribution lines extending to crops, and customizing system layouts for small plots. Development of a hanging plastic water storage bag further lowered the cost to about $5 for a household garden kit.

Small-plot farms ranging in size from household gardens up to one acre can benefit from these drip irrigation systems. In addition to water savings of 30–70 percent, they greatly reduce labor by eliminating the need to carry water to crops several times a day. They also facilitate participation in high-value vegetable markets by delivering fertilizers directly to roots and allowing cultivation during the dry season in areas previously dependent on rainfall. Yield increases of 30 percent have been shown over traditional irrigation methods.



(Text and illustrations above from IDE general brochure: www.ideorg.org)

ANNEX 3: DATA ABOUT ASOMIF MFI MEMBERS

Portfolio and client data (in thousands dollars) – 30/06/2010

			Clients			Portfolio (Dollars)		
Institutions	Main office	Offices	Women	Men	Total	Women	Men	Total
FDL	Managua	36	41'471	31'625	73'096	25'152	40'794	65'946
PRESTANIC	Managua	16	5'303	8'950	14'253	4'490	11'957	16'446
ACODEP	Managua	26	15'367	12'998	28'365	8'332	5'580	13'912
PRODESA	Juigalpa	12	9'730	9'427	19'157	5'439	9'264	14'703
FUNDESER	Managua	22	14'130	15'779	29'909	5'329	9'123	14'451
F JOSE NIEBOROWSKI	Managua	13	2'676	2'992	5'668	2'195	4'901	7'096
CSM 20 DE ABRIL	Quilali	7	2'492	5'230	7'722	2'411	6'362	8'774
CEPRODEL	Managua	16	5'769	4'504	10'273	4'395	4'683	9'078
AFODENIC	Juigalpa	6	2'730	2'661	5'391	3'825	4'714	8'539
FUNDENUSE	Ocotal	10	5'349	6'717	12'066	2'692	4'305	6'998
F León 2000	León	8	4'135	2'150	6'285	3'648	2'568	6'215
FINCA Nicaragua	Managua	11	13'674	3'403	17'077	2'978	1'329	4'307
FODEM	Managua	7	3'470	262	3'732	2'020	341	2'361
PROMUJER	León	5	23'471	1'004	24'475	3'945	151	4'096
FUDEMI	Managua	8	2'676	1'678	4'354	850	943	1'792
F 4i - 2000	Managua	6	3'232	1'197	4'429	836	756	1'592
ASODERI	Rivas	3	1'093	860	1'953	577	622	1'199
ADIM	Managua	3	3'452	352	3'804	589	72	661
PANA PANA	Managua	2	1'229	494	1'723	398	216	613
TOTAL		232	168'440	124'131	**292'571**	88'117	123'542	**211'659**

Portfolio distribution per methodology, gender and MFI (In thousands dollars) 30/06/2010

	Individual			Solidary group			communal bank			TOTAL		
Institutions	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total
ACODEP	5'023	7'919	12'942	557	413	970			0	5'580	8'332	13'912
ADIM	46	191	237	27	397	424			0	73	588	661
AFODENIC	4'714	3'825	8'539			0			0	4'714	3'825	8'539
ASODERI	591	544	1'135	31	33	64			0	622	577	1'199
CEPRODEL	4'684	4'395	9'079			0			0	4'684	4'395	9'079
CSM 20 DE ABRIL	6'362	2'411	8'773			0			0	6'362	2'411	8'773
F 4*i* - 2000	714	632	1'346	25	92	117	16	112	128	755	836	1'591
F José Nieborowski	4'901	2'195	7'096			0			0	4'901	2'195	7'096
F León 2000	2'551	3'580	6'131	16	67	83			0	2'567	3'647	6'214
FDL	37'615	18'056	55'671	3'179	7'096	10'275			0	40'794	25'152	65'946
FINCA Nicaragua	970	1'148	2'118	359	1'830	2'189			0	1'329	2'978	4'307
FODEM	341	2'020	2'361			0			0	341	2'020	2'361
FUDEMI	895	787	1'682	48	62	110			0	943	849	1'792
FUNDENUSE	4'251	2'618	6'869	54	75	129			0	4'305	2'693	6'998
FUNDESER	9'123	4'721	13'844		607	607			0	9'123	5'328	14'451
PANA PANA	215	351	566	1	37	38		10	10	216	398	614
PRESTANIC	11'937	4'359	16'296			0	20	130	150	11'957	4'489	16'446
PRODESA	9'264	5'439	14'703			0			0	9'264	5'439	14'703
PROMUJER	3	74	77	28	677	705	120	3'195	3'315	151	3'946	4'097
Total	104'200	65'265	169'465	4'325	11'386	15'711	156	3'447	3'603	108'681	80'098	188'779
% M/W per credit method	61.5%	38.5%	100.0%	27.5%	72.5%	100.0%	4.3%	95.7%	100.0%	57.6%	42.4%	100.0%
% M/W of total portfolio	55.2%	34.6%	89.8%	2.3%	6.0%	8.3%	0.1%	1.8%	1.9%	57.6%	42.4%	100.0%

(Data from: Microfinanzas No.19, June 2010. Edited by ASOMIF)

DECLARATION OF AUTHORSHIP

" I hereby declare

- that I have written this thesis without any help from others and without the use of documents and aids other than those stated above,
- that I have mentioned all used sources and that I have cited them correctly according to established academic citation rules."

May 23, 2011, Isabelle Stauffer

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