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The Impact of Microloans on Small-scale Coffee
Producers in Veracruz, Mexico

Master's thesis

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Declaration

I hereby certify that work presented in this thesis and entitled as “The Impact of Microloans on Small-scale Coffee Producers in Veracruz, Mexico” is to the best of my knowledge, original, and that the material has not been submitted, either in whole or in part, for a degree at this or any other university. The literature and other sources, which I used, are stated list of references, which are attached to this work.

Prague 18th April 2018

Gabriela Reifová

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Abstract

During the last few decades, coffee farmers in Mexico became one of the poorest groups in the country. The causes are many: repeatedly falling prices of coffee on the international market, lack of technical support and coffee rust disease which negatively affects the production. Small and medium coffee farmers often suffer from financial exclusion and the only source of credit available for them are microloans provided by micro-financial institutions. Microloans are known to be a tool for poor people to help them out of poverty. Accordingly, the aim of this research was to analyse the effects of microloans on the economic situation of the coffee farmers. The research was conducted in the state of Veracruz as it is the second most important coffee producing state in Mexico. Based on a regression analysis, the study revealed that microloans obtained by coffee farmers had a positive and significant impact on the farm revenue. A regression analysis further suggested that processing of coffee production, governmental subsidies, education, insecticides and farm income from the previous year also had a positive significant impact on the farm revenue. On the contrary fertilizers, herbicides, off-farm job, and family workers had a negative significant impact on the farm revenue. It is recommended to improve capacitation and technical services provided by MFIs as there is a need for coffee farmers to start to produce better quality coffee and to focus on value addition in order to become competitive on the market. Coffee farmers should also diversify coffee production to secure themselves in the case of natural disasters.

Keywords: microcredit, small-scale agricultural producers, coffee, Mexico.

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List of Acronyms

AMECAFE	Mexican Coffee Association
BCR	Benefit-cost ratio
CPS	Coffee Product System
GB	Graamen Bank
ICA	International Coffee Agreement
ICO	International Coffee Organization
INMECAFE	Mexican Coffee Institute
MCC	Mexican Coffee Council
MFI	Microfinance Institutions
PRI	Institutional Revolutionary Party
ROR	Rate of return
SAGARPA	The Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food
SDGs	Sustainable Development Goals
TNCs	Transnational companies

1 INTRODUCTION

Millions of people in developing countries live in a poverty without access to basic services. Access to financial services is one of the main constraints poor people usually face. United Nations recognizes this problem and positions financial inclusion as an enabler of 2030 Sustainable Development Goals (UNCDF 2016). Financial markets usually do not want to operate in distant rural areas due to high risk and operational costs. Micro financial institutions, on the other hand, extend the reach of financial markets in these areas where nobody would operate. It is believed that by providing microloans to the poor people their potential income increases and therefore it can help them out of poverty.

According to UNCTAD (2012), 75% of adults suffered from complete financial exclusion in rural areas in Mexico in 2008. The problem was recognized much earlier. The year 2000 was a turning year for microfinance in Mexico (ENIF 2015) when under a rule of the president of that time Vicente Fox, there were launched new instruments and programs to expand formal micro financial institutions (Drahosova & Srnec 2016). Microloans since then on became an alternative way of financing for the major part of the population. Nowadays there are more than 6 million of microcredit borrowers in the whole country (Women's World Banking 2014).

Agriculture in Mexico is still considered as an economic sector with a huge importance for the economy and society. The area devoted to the agricultural production in Mexico occupies more than 50% of the land (FAO 2013) and the share of agriculture on GDP equals to 3,8% (World Bank 2016). Furthermore, 13.4% of the people are employed in the agricultural sector (World Bank 2017).

In the second half of the 20th-century coffee production had a huge importance for the Mexican economy as it was among the biggest coffee producing countries in the world. However, later on, an important institution INMECAFE supporting coffee farmers collapsed and that brought terrible implications to the farmers. Together with falling prices on the international market and coffee rust which hit the coffee production

several times, the coffee farmers became one of the poorest in the country (Equalexchange 2008). Coffee cultivation, nevertheless, maintained its huge social and cultural importance for the society (Szenthe 2017).

Mexico, nowadays, still belongs to the top 10 coffee-producing countries (Szenthe 2017). There are around 500,000 coffee producers (Robles Berlanga 2011) and every year the harvest season generates around 2 millions of jobs (Tierra Fertil 2016). The share of coffee production on agricultural GDP in 2010 was 7,1% (Perez-Soto et.al. 2015) and the share on export in 2016 was 0,1% (OEC 2016). In some regions, coffee production continues to be a dominant source of income for the population. The state of Chiapas and Veracruz are the two most important states in the production of coffee in Mexico.

Due to the above-mentioned facts, most of the coffee producers in Mexico have had to deal with very low income. In coffee-growing municipalities, three out of four farmers earn less than a minimum wage. Such a low income does not permit to improve coffee plantations productivity. Moreover, coffee farmers lack access to financial services and insurance, which also reduces their possibility to grow. Microcredits are often the only financial services available for small coffee farmers living in distant rural areas (Robles Berlanga 2011).

Accordingly, the aim of this research is to analyze the effects of microloans on the income of coffee farmers in the central part of the state of Veracruz in Mexico as well as to describe the role of microfinance for coffee farmers and the coffee farming system. Finally, another objective is to draw recommendations for improvement of the financial services provided to coffee farmers.

2 THEORETICAL BACKGROUND

2.1 Basic Characteristics of Microfinance

Joanna Ledgerwood, 1999 defines microfinance as an economic development approach based on a provision of financial service to low-income women and men with a goal to bring them benefits. Microfinance services, apart from financial intermediation, provide social intermediation as well. The scale of services is ranging from savings, credits, insurance to group formations, trainings for financial literacy and development of self-confidence (Ledgerwood 1999).

Micro financial institutions have expanded in many developing countries. The rationale for it is to enable poor economically active people to access financial services. While new agricultural technologies became the engine for the Green Revolution in the seventies and eighties of the 20th century, the new financial technologies permitted the revolution of microfinance in the nineties of the 20th century (Robinson 2001).

2.1.1 Microfinance Institutions

Poor economically active people from the developing world represent a huge demand for commercial services, primarily for loans and savings. This demand, however, is rarely satisfied from the side of formal financial institutions. Commercial banks are not interested in the provision of services to poor households and micro-enterprises. Operating with small transactions is costly for them and poor clients usually lack traditional collaterals, nor they meet basic requirements to be eligible for the credit. Microfinance Institutions, contrarily, aim with their services at the bottom of the wealth pyramid. Figure 1 graphically shows the target group of Microfinance Institutions, Commercial Banks, and Credit Unions, where the solid horizontal line represents a poverty line and other two dashed lines below the poverty line represent 2 USD and 1 USD expenditure a day per capita (Global Microcredit Summit 2006; Schneider 1997).

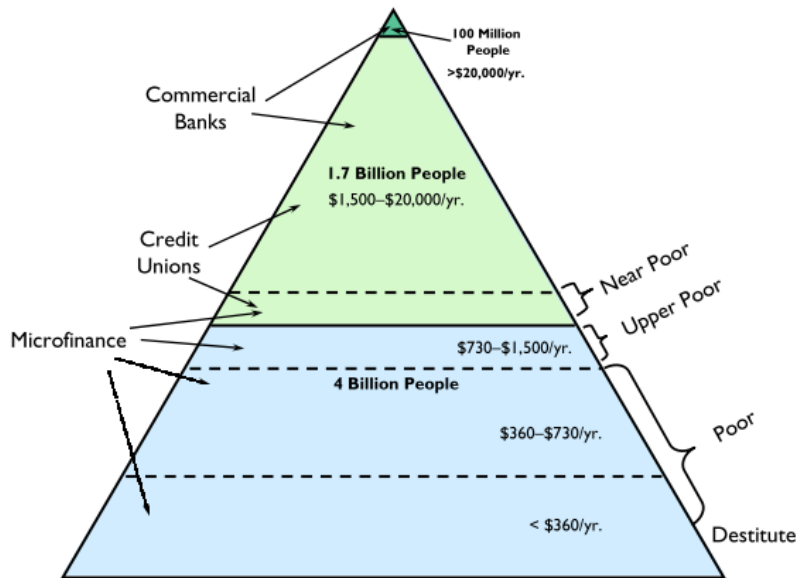


Figure 1: Microfinance reaches lower income levels
(Global Microcredit Summit, 2006)

2.1.2 Microfinance Clients

Microloans are designed for small-scale businessmen and small-scale producers. It is a meaningful tool for economically active poor people, who by means of financial help can improve their business. Microloans are not designed for extremely poor people who are undernourished, ill, without education or job. People being in such conditions are not able to pay for loans since they lack their basic needs (Schneider 1997). Typical micro-financial clients are poor people living in remoted and isolated areas or people who lack job opportunities, lack capital for own business and suffer from weak governmental support. Women clients are usually more preferred compared to men as it is believed that they are more responsible towards loan repayment. Also, women are usually able to make better use of small intake of money compared to men and they are willing to share the benefits obtained from the credit with their family members (Hes 2012).

2.1.3 Principles of Microfinance

Microloans help people with low incomes either to improve their level of living, start or enhance businesses, increase agricultural productivity or to increase cash-flow. (Stupkova 2008). Micro-loans are small-scale loans in terms of tens/hundreds of dollars provided for a short time period usually 4-6 months long in cycles. Clients are permitted to borrow for the first time only a tiny amount which is often repayable in about one

week. If the clients show to be responsible payers, after some time the borrowed amount rises. Loans are usually provided on a principle of a collective liability. That means that the repayment of the debt is guaranteed by the whole group of borrowers, not by an individual. Members of the group choose a representative who collects repayment from the rest of the members and negotiates with the bank. The representative is the one who maintains discipline in the group. If the loan is not repaid, they are not permitted to receive other loans as a penalty. To support and supervise the discipline of the borrowers MFIs hire operatives who control the lending groups. These operatives are coming from the same area and therefore know the social environment very well, moreover, close distances facilitate supervision over the groups. Borrowers are required to adhere to a strict discipline. They are required to attend regular meetings and may be fined for coming late (Hes 2012).

Microfinance can differ from country to country and region to region, but there can be found some features, which they always have in common. Microfinance Institutions operate at a local level and therefore clients both in the rural and urban area have access to the services without overcoming long distances. Loans are provided to people living in the cities, outskirts and in the countryside. Microfinance includes economically active people from all sectors. Another core product of Microfinance is micro-savings. Savings allow the clients to save liquid funds for the future and get some return on their investment. They are designed to be suitable for low-income people requiring low starting balance and low deposits (Robinson 2001).

2.1.4 The Role of Microfinance in the World

Among important milestones from the history of microfinance belongs the year 2005, which was defined as an International Year of Microcredit aiming to stress the importance of financial inclusion and encouraging international actions to address these concerns (OSN 2005; Year of Microcredit 2005). In 2006 Dr. Yunus together with Grameen Bank were awarded by Nobel Peace Prize 2006 for an effort of creating economic and social development. Professor Muhammad Yunus, called the Father of Microfinance, is an important person from the history of microfinance is. Professor Yunus belief was that it is fundamental for every man to have the right to access financial services. Fueled by this idea he established Grameen Bank in Bangladesh in

1983. His goal was to provide poor people with small loans suitable to them and capacitate them in basic financial principles. Dr. Yunus's project had a huge success which led towards a world movement of eradicating poverty through micro lending and his model was replicated in many other countries (Nobel Prize 2006).

The year 2015 was a significant period in the Microfinance development. The number of borrowers rose by 15,8 % from 111 million of customers in 2014. The largest increase was seen in South Asia, which now counts for the biggest number of borrowers. Microfinance sector has developed also in the North (Poisson 2016). The European Union has introduced, in particular, Employment and Social Innovation (EaSI) Programme for a better financial inclusion of micro enterprises promoting sustainable employment (European Commission 2014). The market is dominated by non-banking financial institutions counting for 43.3 %, while banks and NGOs count for 27 % of the market (Poisson 2016).

Microfinance is being addressed by a number of international organizations, among the most important one is United Nations. United Nations Capital Development Fund UNCDF is using micro finance as a tool to combat poverty. Even though Sustainable Development Goals (SDGs) established by UN do not set targets for financial inclusion, access to financial services can be considered as a mediator towards successful achievement of SDGs from 2015 adopted by 2030 Agenda for Sustainable Development (Klapper et al. 2016).

2.1.5 The Criticism of Microfinance

Various authors claim that microfinance received a lot of undeserved attention and popularity thanks to the heart-taking stories of their promoters. According to Roodman (2012) microloans rarely transform lives and very few people manage to reach middle class from the bottom. Despite the fact, that there have been several studies proving a positive impact on the level of earnings, according to Roodman there is no evidence of a positive transformation on household spending and children schooling, which could be considered as a sign of progress. Another phenomenon he discusses is a high number of suicides, which was recorded especially in India in 2010 due to the over-indebtedness.

Karnani (2017) does not agree that microloans could be a tool for eradicating poverty. However, he admits that microcredits may bring some positive non-economic benefits. The positive effects which can be observed, nevertheless, concern only poor borrowers, excluding borrowers living under the poverty line. His assumption is based on a fact that, poor clients having a decent level of income don't fear risk as much and therefore, they are willing to invest in new technologies what usually leads to increase in income. On the contrary, people living under the poverty line tend to produce in the old ordinary way without new technologies and hiring new labor. For that reason, with the few assets available they are never able to operate on a larger scale and to achieve efficiency in the production. Karnani is not the only one driving attention to this issue. There are many other authors, such as Amin (2003), Coleman (2004), Montgomery et al., (2005), who agree that microfinance does not have the power to bring positive impacts to the vulnerable strata of the society.

Chang and Bateman (2012) point out on a phenomenon of acquiring microloans for different purposes from investments. Clients tend to spend loans on goods, services or social and religious ceremonies, such as health fees, weddings or funerals instead of investing and enhancing the production or business. Similar data obtained Hickel (2015) from his research conducted in South Africa. Outcomes of his study showed, that 94 % of the borrowers acquiring loans for production or business spent money mostly on daily expenditures. A study conducted by Burki (2010) in Pakistan also revealed that even though borrowers still predominantly use loans for business needs, they are increasingly using credit for household consumption. Stupkova (2008) agrees that this issue is a common phenomenon in Mexico. Using loans for distinct purposes than acquired may be considered as a moral hazard. On the other hand, Stupkova claims, that dividing the use of loan between consumption and investment makes little sense and should be united. The reason why is that these two activities are overlapping as households besides selling their agriculture production on the market also use a part of it for their own consumption.

Hickles (2015) further criticize the microfinance's inability of creating new job vacancies. Not only micro-entrepreneurs and small-producers are those, who suffer from lack of financial resources but also consumers. Without them being able to

purchase newly created goods and services, there is no demand. New businesses are therefore not able to find a stable place on the market and they either replace the already existing ones or cease to exist. No new job vacancies are, therefore, created.

Microfinance Institutions often face a criticism for extremely high interest rates (Chang & Bateman 2012; Hickel 2015). Becchetti et al. (2005), however, claim that the question of nondiscriminatory interest rate is controversial. On the contrary from the Commercial banks, MFIs operate in distant areas with small portfolios which naturally causes much higher operating expenses. Higher expenses, of MFIs, therefore, must be covered by charging higher interest rates. Services of Commercial banks are moreover hardly accessible for poor people living in remote areas. Exposed to the overpriced unofficial money lenders it is still more convenient for people from rural areas to approach MFIs with their services.

Supporting micro business exclusively through micro-financing cannot be sustainable in a long run, claim Chang and Bateman (2012). Promotion of well-working business with no special technology or skills required must necessarily attract many people. However, such attitude can lead only to situations such as tens of women selling a couple of tomatoes in the same row, say the authors. Lending money is not a solution for eradicating poverty either in the opinion of Karnani (2007). There must be created new stable jobs and increased work productivity as it was experienced in China, Vietnam, and South Korea in the recent years. Also, Roodman (2012) supports the idea of not pouring any more money into micro lending. Instead, he proposes to use the money for start-up investments, trainings and provision of a variety of services to the poor.

2.2 Financial Inclusion in Mexico

The data from 2008 showed, that 52% of municipalities in Mexico do not host any financial institutions and 75% of adults are completely excluded from financial services. These rates are very high in comparison to the other OECD countries, where the average exclusion rate at a national level is only 8%. Access to financial services is one of the main difficulties for small and medium-scale producers in rural areas in Mexico. Firstly, it is the lack of the presence of financial institutions in the rural areas, as the majority of them are situated in big towns and cities. Secondly, it is the long distances and bad quality of infrastructure which makes it difficult for people to even reach financial institutions in that places. Finally, commercial banks are not interested in providing loans to the people from the rural areas as they are usually considered as problematic clients with high default rates and small size loans. Even though there can be found few banks operating in the agricultural sector in Mexico, their services are mainly designed for large-scale producers or cooperatives (UNCTAD 2012).

From the above reasons, people from rural areas, have usually no other choice than to rely on loans from informal local lenders with extremely high interest rates. Small farmers, moreover, have usually a little to guarantee when applying for a loan. The majority of them are not formal owners of their land as the land is under the ejido-type tenancy and it is not accepted by financial institutions as a collateral. Whereas Microfinance Institutions could be a good source of credit for people from rural areas, their services are mainly designated for non-farm activities.

Apart from the scarcity of rural credit for agricultural producers, there is also a problem of a limited access to agricultural insurance. Even though the Mexican government recently introduced a new module for insurance for natural disasters, agricultural producers find this step insufficient since the module does address most of the risks they have to face in everyday life (UNCTAD 2012).

2.2.1 The Development of Micro-financial Sector in Mexico

The microfinance sector in Mexico has gone through a slow development in contrast to other countries. While the worldwide growth counted for about 35%, in Mexico it was only 20% affecting solely 9% of the economically active population. This situation was a result of a slow growth of nonprofit organizations in Mexico and the absence of successful microfinance institutions capable to serve as an example for others (ENIF 2015).

The year 2000, became a turning year for microfinance in Mexico. In 2001, the International Microfinance Forum identified Mexico as a country with a great potential for growth in the microfinance sector (ENIF 2015). From then on, the trend of Microfinance Institutions started to grow rapidly until the year 2008 when the growth was drastically cut as a result of the global financial crises. Economic problems were accompanying Microfinance Institutions also in the following years. They had to deal with the reduced demand for financial services, borrowers inability to pay their debts, lack of available resources and rising cost of funds. Many efforts were made from the side of MFIs to maintain the number of clients. By the end of 2008, the data already showed that the dynamic of a number of clients remained the same as before the crises busted out (Krell 2013).

In 2012 the 56% of the population already had at least one financial product. In 2015 the number increased up to 68% from which 44% of the clients were bank account users. The percentage of people using either commercial or micro credit has increased by 2015 to 29%. The number of men possessing bank accounts exceeded women in 2015, however, surveys showed that in rural areas women usually dominate with an ownership of bank accounts overcoming men by 6% (ENIF 2015). Nowadays, there are more than 6 million of microcredit borrowers and almost 5 thousand financial providers on the Mexican financial market (Womens' World Banking 2014). Microfinance institutions, which are 66 (CGAP 2016) are not the only ones who offer microloans in Mexico, there is a range of micro financial services providers such as commercial banks, cooperatives, individual providers and pawnshops. Most of microloans are mediated to focus-groups, but also as individual loans (Womens' World Banking 2014).

Despite the successful development of the microfinance sector in Mexico during the last two decades, Mexico seems to be waning in comparison with other Latin American countries where the microfinance markets are quickly growing or are saturated. The major differences between the micro financial services provided in Mexico and in other Latin American countries are the following: unlike Mexico, in other Latin American countries, the loans are available to both micro entrepreneurs and to wage workers; there is a wider range of micro-loans providers in other Latin American countries, such as commercial banks, cooperatives, credit providers and pawn shops; an individual credit applicant in Mexico is evaluated primarily based on his or her credit history or credit rating, unlike other Latin American countries using rigorous risk assessment of business and the family unit (Womens' World Banking 2014).

2.3 Coffee in Context

Coffee, after petroleum products, is the second most traded commodity in the world (Hwang 2017). For low and middle-income countries, it represents the main source of export revenue (Varangis et al. 1995). Coffee is produced in more than 60 countries. The main producers are Brazil, Vietnam, and Indonesia (Gonzalez-Perez & Gutierrez-Viana 2012). There are two most commonly grown species of coffee (Figure 2): Arabica mostly produced in Latin American countries counting for more than 70% of world production and Robusta produced mainly in African countries and Southeast Asia (Milas et al. 2004). Coffea Arabica and Robusta are among the five most important crops for agricultural export from developing countries (Ricketts et al 2004).

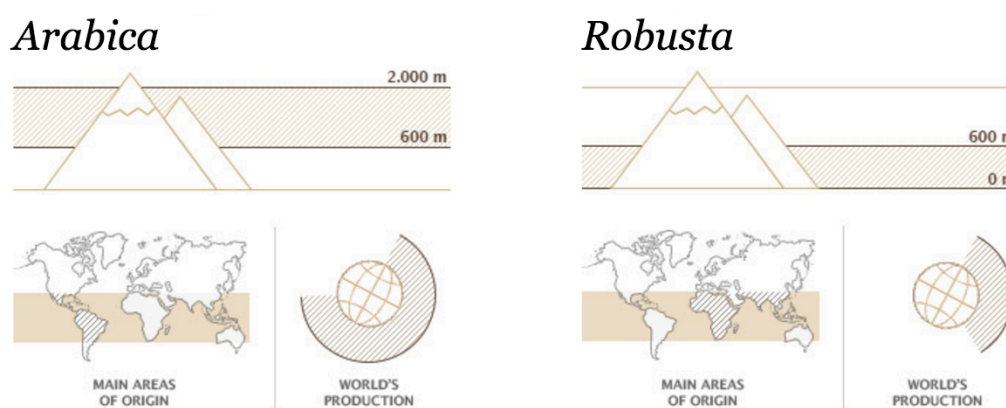


Figure 2: *Coffea Arabica* versus *Coffea Robusta* (Lavazza 2016)

The quality of coffee is generally based on a combination of several factors. First of all, it is the botanical variety and the topographical conditions, which as being constant attributes, dominate to the character of coffee. Secondly, it is the weather conditions, which are variable and cannot be influenced. Quality can fluctuate from season to season. Lastly, it is the care dedicated to the coffee plants during the growing period, harvesting, storing, preparing for export and transporting what influence the quality (ITC 2001). Talking about the coffee cup quality there are considered more factors, such as time of grinding the beans, time of roasting the beans, cleanliness of brewing equipment, proper cooking temperature and brewing time. Quality standards vary by country and evaluating institution. Most standardized measures are provided by International Coffee Organization (ICO) (Osorio-Garcia 2014).

Coffea Arabica and *Coffea Robusta* also vary by quality as the conditions for their production are very different. As a result, there are obtained coffees with different features, flavors, and quality grades. Extensively produced *Coffea Arabica* is sold for higher prices than *Coffea Robusta*. On the contrary *Coffea Robusta*, covering the approximate 30% of the global market is more resistant to diseases and can be grown in lower altitudes which facilitate its production (FNC 2010). Coffee beans of *Robusta* are more robust resulting in inferior taste and higher caffeine content (Griffin 2012).

2.3.1 Coffee Production Process

Coffee beans are seeds. They are planted in beds in shaded nurseries and grown to a size to be hearty enough to replant permanently. It takes approximately 3 to 4 years for the plants to bear fruits. Once the fruit called coffee cherry turns bright deep red it is ready to harvest. In most of the producing countries, there is one major harvesting season. In some countries, the weather conditions enable growing coffee nearly all year. The secondary smaller crop is called fly crop (see Table 1) (NCA 2017; Scott 2015).

Table 1: Harvest Seasons of Coffee Growing Countries (Scott, 2015)

Country	Main Crop	Fly Crop
Brazil	May – September	N/A
Colombia	September – January	March – June

Costa Rica	October – March	N/A
Guatemala	September – April	N/A
Honduras	September – February	N/A
Mexico	September – March	N/A
Peru	June – November	N/A
Hawaii	October – March	N/A
Sumatra	October – March	N/A
Ethiopia	November – February	N/A
Kenya	October – March	May – August
Tanzania	October – February	N/A
Yemen	October – December	N/A
Jamaica	December – March	N/A

Harvesting is typically done by man labor. In some places, where the landscape is relatively flat, like in Brazil, the harvest process is mechanized. Coffee beans can get spoilage very easily, therefore once the fruits are picked processing must begin as soon as possible. There are two ways how to process the coffee beans, depending on local resources (NCA 2017).

The traditional method of processing is a dry method. It is still used mostly in countries with a lack of water resources. The coffee cherries are immediately after picking spread out on huge surfaces a dried in the sun. Due to the susceptibility of coffee cherries getting spoil, they are raked and turned a couple of times during the day and covered for the night to prevent them from humidity. The drying process finishes when the moisture content drops to 11%. It may take several weeks, depending on the weather conditions, until the cherries are ready for storage (NCA 2017).

The other method is a wet method. This method removes the pulp of the fruit right after the harvest. From freshly harvested cherries is separated the skin and the pulp from the bean through a pulping machine. The beans are further separated by weight. They are sent through a water channel where the ripe heavier beans sink to the bottom and lighter float on the top. When the beans are separated, they are placed in fermentation tanks, where they remain for about 12 to 48 hours depending on the climate, altitude and other factors. Fermentation is done in order to remove a slick layer of mucilage from the bean

(Figure 3). Enzymes dissolve the layer out. Finally, the beans are ready for sun drying on drying tables or floors (NCA 2017).

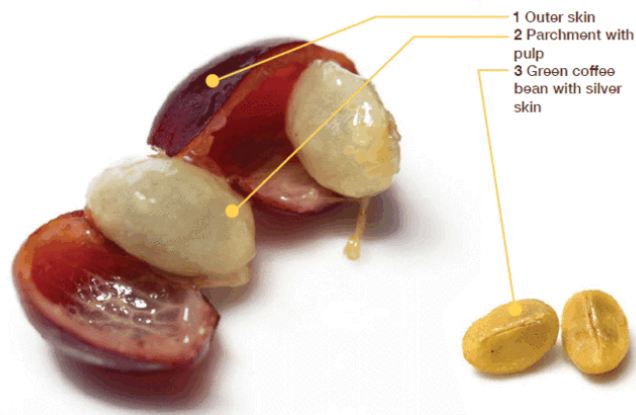


Figure 3: The Coffee Bean Structure (Scaffee 2017)

Before selling, the coffee parchment is being processed. In a case of the dry method, there is removed the entire dried husk in the hulling machinery. In a case of the wet method, there is removed the parchment layer from the already processed bean. An optional process is polishing of the beans in order to remove any remains of the silver skin. In this phase, there is obtained so-called green coffee, which is usually exported for further processing. The last phase is roasting which transforms green coffee to the brown beans purchasable in stores and supermarkets (NCA 2017).

Small or medium coffee producers in Mexico usually lack machinery for coffee processing. Therefore, they mostly sell harvested unprocessed coffee in the form of coffee cherries. Another reason for selling coffee cherries is obtaining fast money. There are producers who own hulling machines and therefore can take the advantage of adding value to the production and sell coffee in form of parchment for a higher price. A smaller group of producers toast their own coffee.

2.4 Coffee Production in Mexico

Coffee has been introduced into the Mexican agriculture more than two hundred years ago. The coffee grain is considered as one of the most important crops in economic, sociocultural and environmental terms (Pérez & Díaz 2000). Coffee is produced by almost 500.000 producers in 58 regions, 12 states on a surface of 664.794 ha. According to the survey, some 85 % of the producers are indigenous. On the production of coffee is dependent both directly and indirectly three millions of people (Escamilla et al. 2005; USDA 2017).

2.4.1 Institutional Arrangement

As coffee always played an important role in the Mexican economy, in the second half of the 20th century there were many efforts at the national level to enhance the coffee production (Quesada 2004). There was established a governmental organization INMECAFE (the Mexican Coffee Institute) to support small and medium coffee producers. INMECAFE provided them with technical support, credits, guaranteed purchases and transportation to market. Moreover, INMECAFE was a part of the ICA (International Coffee Agreement) between coffee producing and consuming countries which was created to stabilize volatile prices on the coffee market (Equalexchange 2008). Other interventions in the coffee production begun this organization by its standardization. There were distributed new coffee varieties, non-native shade species and commercialized fertilizers (Cortés et al. 1996). Under the support of INMECAFE from 1973 to 1989, coffee production flourished (Equalexchange 2008). Later by the 1980s, coffee counted for 35% of the total agricultural export and became one of the principal agricultural exports (Quesada 2004). INMECAFE also implemented new highly influential policies in the state of Veracruz. Many communities started to replace crops such as maize, citrus or sugar cane for coffee and based on recommendations of INMECAFE to produce coffee as a mono crop. These implemented policies were successful in the state of Veracruz as between the years 1975 and 1985 the coffee production expanded by 29% (Tucker, 2009). In 1980s, nevertheless, Mexican government had to deal with financial crisis and as a result INMECAFE started to collapse and in 1989 ceased to exist. This happened almost simultaneously with the

collapse of the ICA due to cheap prices of Brazilian coffee which dumped on the international market. These incidents had devastating implications on the coffee farmer in Mexico. Coffee farmers lost access to the market, to credit and the technical support (Equalexchange 2008).

In 1993 there was founded Mexican Coffee Council (MCC) as a representative organization for the coffee industry. This autonomous civil association with a legal presence served for negotiations of the policies and programs related to the coffee sector. There were also created regional councils in the main producing states. Compared to INMECAFE this council did not take on several public services, such as extension, research, and technology transfer. These gaps were further taken over by other public and private institutions. Nevertheless, the gap of technical assistance was not filled by any institution. The MCC was abolished in 2004. MCC had its direct substitute organizations: the Coffee Product System (CPS) and the Mexican Coffee Association (AMECAFE). These institutions were in charge of implementation of all legislative and governmental regulations related to coffee. The CPS synchronizes public policies and programs and it also represents the coffee industry at a national level. The non-governmental organization AMECAFE operates with the main representative partners in the coffee industry (Rodriguez-Padron & Burger 2016).

The gap of technical assistance has still not been filled despite the fact that there is a number of institutions providing advisory services for the coffee farmers, however not to the same degree as INMECAFE did. Gaps are further being filled by individual advisors from the private sector, groups of advisors, NGOs and coffee firms. Nevertheless, only few farmers can afford the cost of these services despite the importance of technical assistance in the coffee production. According to the National Coffee Census only 9.6% of the coffee farmers reported to be receiving some form of technical assistance (Rodriguez-Padron & Burger 2016).

Coffee producers are further supported by programs of SAGARPA, The Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food. SAGARPA as a state secretary is in charge of administrating federal resources for rural development. One of its current program is called “PROCAFÉ e Impulso Productivo al Café” designed for

coffee producers to renew their coffee plantations of low productivity. The actions taken withing this program are distributing of 1000 plants/ha for discounted price (1MXN/plant) and technological packages up to 2500 MXN/ha. SAGARPA also provides subsidies in a form of covering 70% of costs for inspection for organic certification (Sagarpa 2017).

2.4.2 Market organization

The coffee supply chain in Mexico can be considered as buyer-driven. Generally, it is governed by powerful global players, the transnational companies such as AMSA, Cafes California and Café Tomari. TNCs usually provide only limited information about the prices as a strategy to keep low transaction costs at the farm gate and therefore maintain their power on the market. Under TNCs in the supply chain are intermediaries who deliver coffee either to them or to the processing centers (as for instance Café Bola de Oro). In the figure 4 below the structure of the coffee supply chain can be observed as well as the important supply chain actors (Hernandez-Galvan 2014).

The willingness of the coffee producers to gather into cooperatives is quite low. Cooperatives in Mexico are perceived as “fraudulent” or “too political” and not useful. It is assumed that this is a consequence of a 70 years of the PRI (Partido Revolucionario Institucional) governance which used cooperatives to distribute patronage and to secure votes. Cooperatives are moreover identified with low business management experience and finance (Eakin et al. 2006).

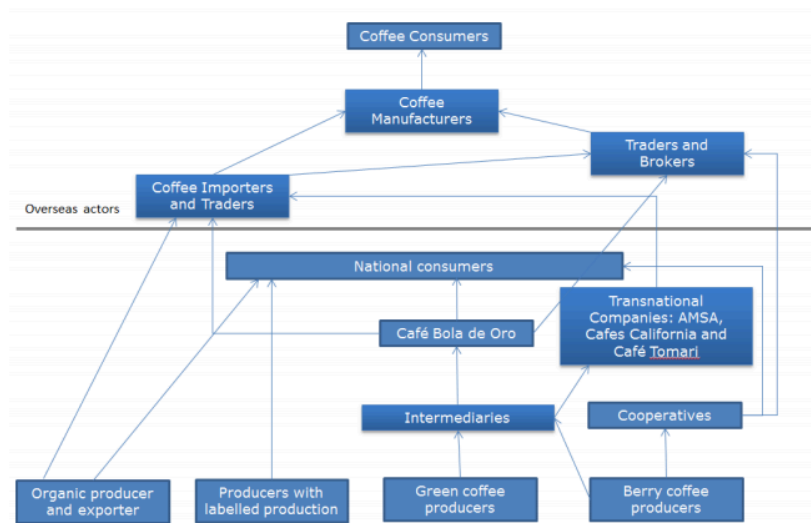


Figure 4: Coffee value chain in Mexico (Hernandez-Galvan 2014)

Coffee producers mostly sell their production in a form of coffee cherries to the local coffee brokers. A general perception of the farmers is that no matter the good practices applied as well as coffee quality they will sell their harvest for low prices, because coffee brokers do not distinguish the quality anyway and mix all the varieties and qualities of the farmers' production together (Sagarpa 2013).

2.4.3 Prices development

Since the termination of INMECAFE coffee sector has been repeatedly negatively affected by falling prices of coffee on the international market. One of the most severe crisis in the coffee sector was between 1998 – 2004, which again brought consequences such as elevated migration wave and abandoned plantations, substitution of coffee plants by other crops not in symbiosis with the environment, higher incidence of grain diseases, decline in the production and exportation as well as drop in the human development in these areas (Escamilla et al. 2005). Over the course of the next 12 years the production of coffee kept declining due to lower production of the coffee plantations and dwindling land. In the last years the production was moreover negatively affected by presence of coffee rust (Figure 5) which caused a decrease of the production on national level (FIRA, 2016).

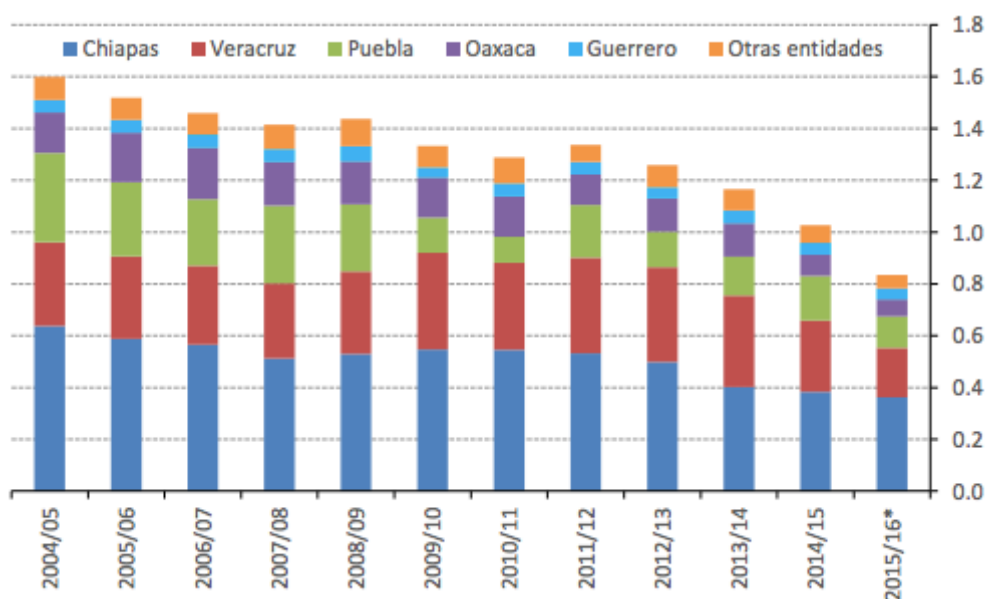


Figure 5: Cherry Coffee Production in Mexico (Millions of tons) 2004/05 – 2015/16 (FIRA, 2016)

Coffee rust Roya (Figure 6 and 7) first appeared in the country in 1981 and since then hit several times (CEFP, 2001). The infestation by the fungus affecting mature leaves of the crop leads to plant defoliation. According to the degree of severity can cause an intense fall of the leaves and therefore impacts the ability of the plant to produce fruits where the grain is found. This finally results in losses in the production (Anacafé). The coffee rust started to spread in Central America and Mexico again in 2010 (Cristancho et al., 2012). Firstly, in 2012 it affected only one region in the state of Chiapas but later on in 2013 it already spread out in the whole Chiapas state. In 2014 and 2015 coffee rust also reached the states of Veracruz, Oaxaca, Puebla and others causing a huge harm on the coffee production (Amerac 2016). From 2012 to 2016 the production of coffee cherries dropped almost to half (FIRA, 2016).



Figure 6: Hemileia vastatrix
(Asociación Nacional del Café, 2017)



Figure 7: Hemileia vastatrix
(Anacafé, 2013)

2.4.4 Challenges in coffee production

As an implication of all the described issues, coffee regions are dealing poverty. Seven out of ten inhabitants are living in conditions of high marginalization. More than 75% of the population live with high or very high nutritional risk and they lack services such as piped water and drainage as well as better housing conditions such as cooking gas and cement floor, etc. (Robles-Berlanga 2011).

Apart from low prices and Roya disease, there are other challenges coffee farmers have to face. One of them is a lack of technical support (as mentioned above) and a quality of coffee which has been neglected in the last decade and which is crucial factor for the

competitiveness on the market. Quality is related to the micro-regions, their agro-climatic parameters and the coffee varieties whether they are arabic, cathoric, robust, or hybrids. In Veracruz most of the farmers do not follow any regulations concerning coffee production nor recommendations regarding different varieties of coffee. They tend to mix several coffee varieties on their plantations as they know that coffee brokers whom they will sell the harvest will mix all varieties anyway without distinguishing any parameters of quality. Coffee farmers dependent on local coffee brokers do not usually have any bargaining power (Sagarpa 2013).

3 EMPIRICAL LITERATURE REVIEW

This chapter gathers various studies on microfinances in developing countries. The first section presents studies which have examined the impact of microfinance on various socio-economic aspects such as nutrition, women empowerment, welfare, poverty reduction etc. In the second section there are presented studies which have evaluated the impact of microfinance on agricultural production, which is the focus of interest of this study.

3.1 The Effects of Microfinance in Developing Countries

Study Cases from Bolivia

Mosley (2001) conducted a qualitative study in Bolivia, seeking the impact of microloans on poverty. The study was based on four small sample surveys of two rural and two urban MFIs. There was used a range of poverty concepts, such as income, asset holdings and diversity, and vulnerability. Mosley found out that, despite microfinance's positive impact on income and asset levels, it also increased clients' vulnerability. The level of average debt ratio of the borrowers of studied MFIs was disturbingly high and therefore very risky. Coping mechanisms of the clients was not strong enough and therefore any failure could result in decapitalization and impoverishment.

MkNelly & Dunford (1999) analyzed the impact of microcredit on children's nutritional status, women's economic capacity and women empowerment in Bolivia. The study was based on a mix of qualitative and quantitative methods (quasi-experiment). Respondents from 19 communities were divided into three groups: 1. with credit and education, 2. without credit, but living in communities with a credit program, 3. control group with no credit. The results showed, that program Credit with Education, fostered entrepreneurial skills of the participants and 90% of participants increased the level of their income since joining this program. There was also registered a great positive change in health and nutrition practices of the participants. Lastly, the research provides positive evidence on women empowerment in terms of decision making of how much to spend on house repairs and family planning. No positive effect was found on maternal nutritional status nor nutritional status of their children.

Study case from Ghana

Anane (2012) conducted a research in rural Ghana to explore the effects of MFIs on small and medium scale enterprises. The studied sample group composed of 93 long-term clients, small and medium entrepreneurs, of two local MFIs. The data were collected based on semi structured questionnaires and were analyzed using both descriptive and quantitative approaches. Anane found out that the majority of the sample using a credit indicated that the services provided by MFI enhance productivity and income as well as income and savings at a household level. Finally, Anane recommends that the disbursement of loans by MFIs should be done on time so that the small and medium entrepreneurs can acquire the appropriate inputs and tools, hence to be able to undertake the production at the right time. Further, that the sizes of the provided loans should increase to engender entrepreneurs' major investments into manufacturing and small-scale industry. Also, that there should be offered more flexibility for loan repayment especially during the formative years in order not to put unnecessary pressure on the clients. Another recommendation is to lower interest rates which make it difficult for rural entrepreneurs to invest in their business. Instead of applying high interest rates as a source of guarantee for MFIs, they should focus on strengthening the scheme of group lending which could substitute this kind of guarantee.

Study Case from Zanzibar

Haji (2013) analyzed the contribution of Microfinance Institutions to the poverty reduction. The research was carried out in South district of Zanzibar. It was based on data collection through questionnaires conducted with 50 borrowers and one MFI. Results obtained based on qualitative and quantitative analysis (descriptive statistics and cross tabulation) showed a positive impact of microloans on the life of the poor people. Loans obtained from local MFIs increased their clients' income which led to the expansion of their businesses. It was recommended to reduce the frequency of repayment and to provide long term loans for agricultural businesses. Also, that MFIs should incorporate to their training contents workshops on business skills.

Study Case from Pakistan

Haroon (2008) tried to verify the social and economic impacts of microfinance in Pakistan, where MFIs receive an increasing support from national governments, NGOs as well as donor agencies. On a sample of 3400 respondents from six Pakistani MFIs, he carried out an econometric analysis to find out the impact of microcredit on income, households expenditure, child education and women empowerment. Results of his study showed a positive correlation between microloans and income, child school enrollment, and to a certain extent also on the level of household expenditure. Results concerning women empowerment were mixed and in many cases contradictory. Impact of microfinance on women empowerment was not found as positive.

Study Case from Bangladesh

Hassan and Guerrero (1997) accessed in their study the experience of the famous Grameen Bank in Bangladesh in community development. The study described Grameen Bank as a unique financial institution which was able to develop a system of providing loans to poor people without a necessity of physical collateral. By creating groups of borrowers who share responsibilities for debt payments, Graamen Bank creates a viable program for the poor. GB main focus is on the enhancement of the well-being of its clients. By organizing clients into the groups GB promotes solidarity and mutual support of the members. Of course, there are external factors, which also play a big role in the success of GB. Effectiveness and sustainability of the GB operations are highly dependent on national policies, which must assure the autonomous status of the MFI and freedom from a political influence.

Amin (2003) in his paper brings an evidence from northern Bangladesh on how microcredit reach the poor and vulnerable. Amin evaluated microcredit programs with a dataset based on monthly consumption and income of 229 households. Outcomes of his study showed that while microcredit has positive impacts on poor and vulnerable people, it does not have such effects on people most prone to destitution.

Study Case from Thailand

Coleman (1999) examined in his study effects of group lending on borrower's welfare in Northeast Thailand. In a quasi-experiment Coleman conducted got involved people who

already had credit, people one-year prior credit and noncredit recipients. Results revealed that group lending participants tend to be wealthier than people who do not participate at all. Further, that poorer villagers tend to participate less likely than wealthier villagers. Overall, it was demonstrated that microloans have a positive impact on household's welfare of wealthier members of the group, not on poorer rank, where the impact was almost insignificant. It was recommended to increase vigilance in targeting the poor and introduction and enforcement of wealth-based criteria.

3.2 Impact of Microfinance on Agriculture Production

Study Cases from Ghana

Nuhu et al. (2014) conducted an impact analysis of microfinance on crop production in Ghana. The study focused on maize and rice production was based on quantitative methods, using analysis of Chi-square test of independence and the Ordinary Least Square (OLS) regression model. The authors used a sample size of 100 respondents who have accessed microcredit. The outcomes showed a significant relationship between microcredit and the agriculture production.

Sulemana and Adjei (2015) conducted a similar study a year later focused on the impact of microfinance on agricultural production. The data obtained were analyzed based on regression analysis and demonstrated a positive relation of microfinance and agricultural production of fish, maize, and rice. The challenges revealed from the study included: unavailability of collateral, small loan amounts, delay in the release of the loans, lack of knowledge of farmers in the acquisition of credit and creating saving.

Agyemang (2017) conducted a study where he analyzed the impact of microcredit on small and medium scale poultry production in Ghana. The data were collected from 61 microcredit receivers and 39 non-receivers and analyzed using probit model, data envelopment analysis (DEA), inefficiency model and the propensity score matching (PSM) technique along with linear regression. It was revealed that farmers with higher education and experience, more assets a micro-savings tend to use microcredit compared to large-scale farmers. Based on the inefficiency model it was further revealed that higher education and experience, microcredit, capital and labor lead to

efficient production. On the contrary large farms leads to inefficiency. Also, it was found out that 14% of the microcredit receivers were more efficient compared to non-receivers. Further analysis showed that microcredit has a positive impact on the production of eggs and chicken as well as on farm's income.

Study Cases from Nigeria

Tibi et al. (2012) conducted a research focused on the impact of microfinance on small-scale poultry production in Nigeria. A total number of 280 participants from 20 communities were used for the study. For the data analysis and identification of the credit effects it was used a linear regression model. Results showed that among the most significant positive regressors were: household size, showing that more family members involved in the production, higher yields as well as the quality and sufficiency of fodder.

Oboh et al. (2010) analyzed in their study the impact of socio-economic and demographic factors on the credit allocation. The research was conducted with arable crop farmers in Nigeria. Their study sample consisted of 300 loan beneficiaries and collected data were analyzed based on multiple regression analysis. Their findings showed that only 56% of the loans were invested in farm activities and there was found correlation between this phenomenon and smaller size loans. Other factors which significantly affected the allocation of loans in the agricultural production were age, education, farm and household size, loan delay and supervisory visits of farmers.

Study Cases from Tanzania

Girabi et al. (2013) studied an impact of microfinance on smallholder farm productivity in Tanzania. Likewise, Oboh et al. (2010) their results showed that acquisition of agricultural loans not always result in investment in the agriculture. It was revealed that only 26,5% of the borrowed money was invested in the agricultural production. Rural farmers tend to spend credits for food, health, education etc.

3.3 Topic Justification

Since the 1970s, but mainly during the new wave of microfinance in the 1990s, microcredit has been perceived as an important tool to poverty reduction (Mazumder & Wencong 2013). For that reason, a number of authors have conducted studies in order to evaluate the performance and implications of microfinance. Studies were mostly focused on the economic and social impacts of microfinance services. Among the most evaluated social indicators are household income, level of education, a level of women empowerment in decision making, nutrition improvement etc. Concerning economic indicators, the focus of the studies has been put mainly on the evaluation of the performance of small and medium enterprises. In contrast, there is an inadequate empirical evidence accessing the effects of microfinances on the agriculture production where majority of the low-income farmers exist and the few conducted were focused almost only on African continent as it is evident from the review in 3.2.

When talking about the impact of microfinances as an instrument for development and poverty alleviation, there must be taken into the consideration the political, economic, environmental, social, and cultural differences between the countries. Likewise, Green Revolution in the middle of the 20th century did not succeed on a global level, microfinance does not necessarily have to perform in the same way in all countries and regions. It justifies the need for more evidence on the performance of microfinances from other parts of the world. In our case the state of Veracruz in Mexico has been chosen, as to the researcher's effort, there has not been any similar study done in this site.

4 OBJECTIVES

The aim of this research is to analyze the effects of microfinances on the economic situation of coffee farmers in the remote regions in the central part of the state of Veracruz in Mexico. In turn, this general objective translates in 4 specific objectives:

1. To describe the farming system developed in coffee production in the investigated area also with the aim to show its specificity.
2. To describe the role microfinances in the context of other financial instruments and public intervention available for coffee farmers in the studied region.
3. To analyze empirically the relationship between microloans and income generated from the coffee production taking into account other factors affecting the coffee production and household income.
4. To draw recommendation for improvement of the financial services to coffee farmers.

5 METHODOLOGY

This section includes the reasons for selection of the studied area, the research approach, the procedure of data collection, finally the methods for data analysis and limitations which occurred during the data collection.

5.1 Profile of the Study Site

After the termination of INMECAFE, coffee farmers had to deal with many challenges, and together with declining coffee prices and coffee rust coffee farmers became one of the poorest in the country (Equalexchange 2008). State of Veracruz (Figure 8) which has been selected for this research has a long history in the production of coffee dating back to the late 18th century (Quesada 2004). Coffee in Mexico is produced in 15 states and Veracruz is the second most important producer contributing by 28 % to the total production (USDA, 2017). The number of smallholder farmers (landholding about 2 ha) in Veracruz focusing their production primarily on coffee is very high as it counts for about 80% of all coffee farmers (Sagarpa 2013).

Veracruz is one of the two states exhibiting the lowest inclusion of its inhabitants in the formal financial system in Mexico (CONAIF 2017). On the other hand, it is among the 5 states with the biggest number of operating micro-financial institutions (Bautista 2015). Microcredits are therefore often the only financial products available for small coffee farmers living in distant rural areas (Robles Berlanga 2011).



Figure 8: Veracruz State (Google maps, 2017)

The collection of data was carried out in a central part of the state Veracruz in 5 municipalities (7 villages/colonies): Coatepec, Córdoba, Cosautlan, Xalapa, and Xico. These are located close to two major cities Cordoba and Xalapa and a small town Coatepec, sometimes historically called "The capital of Coffee in Mexico" indicating the importance of this town for coffee producers of the region. Despite the importance of coffee in this region, regular financial institutions are not willing to provide coffee farmers with credit due to low production prices, low-profit margins, and risk which brings the instability of coffee production (Hernandez-Galvan 2014).

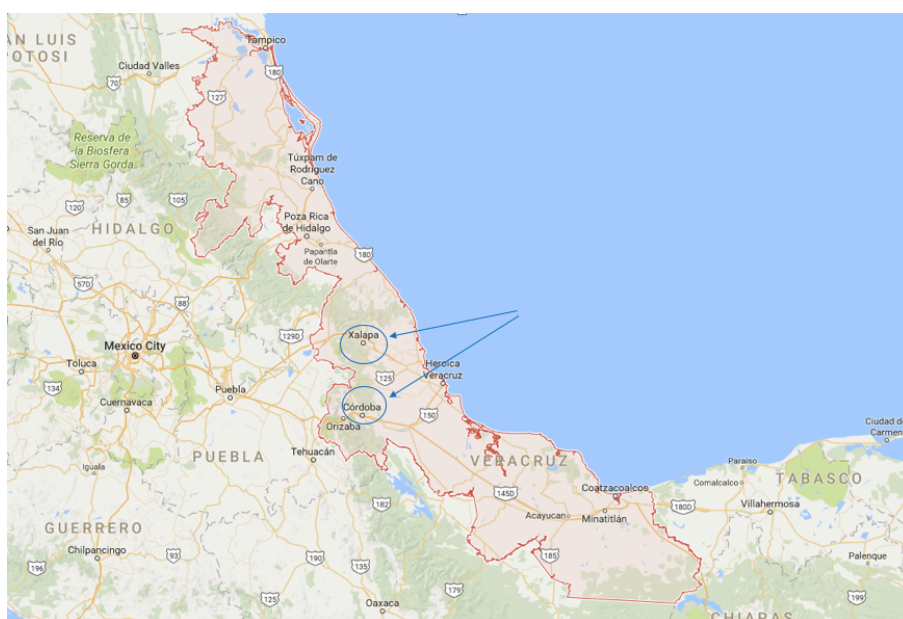


Figure 9: Area of Research in the state of Veracruz (Google maps, 2017)

5.2 Data collection

There was conducted a desk research in order to understand the theoretical background and empirical evidence of micro financial services provided in the world and also in Mexico, particularly in the state of Veracruz. Information from previous studies helped us to get familiar with the concepts and methods used as well as outcomes obtained. Further, there were collected information concerning coffee production in Mexico and in Veracruz.

A combination of qualitative and quantitative methods was decided for the analysis. Methods used for collection of data in the field included:

- Structured interviews (quantitative method)
- Semi-structured interviews (qualitative methods)

There were collected 90 questionnaires through structured interviews (Appendix 1). Respondents were smallholders - coffee producers. The sampling procedure was primarily based on a list of names/clients provided by the most important MFI for the coffee producers of the region. This organization called Regional Coffee Council of Coatepec (Consejo Regional del Café de Coatepec) is a non-profit organization providing services (credit, technical support) exclusively to coffee producers. A further selection of respondents was based on a technique of snowball sampling. The interviews were conducted in a natural environment for the respondent's such as in their household, a house of their neighbor, or outdoor at their farm or in the village. Sixty questionnaires (2/3 of all) were conducted with coffee producers who used microloans in coffee production. Other thirty questionnaires (1/3 of all) were conducted with coffee farmers who have not acquired any micro loan. The second group served as a control group in the analysis. The questionnaires consisted of 5 sections: related to the demographic data (sex, age, marital status, number of children, education) credit information (loan size, interest rate, payback period, number of loans, additional services provided by MFIs), production inputs (size of the land, plants density, labor force, use of higher technological inputs), outputs (volumes, market prices, the share of processed production) and annual farm income.



Figure 10: Collection of Data - Structured Interview

The aim of the semi-structured interviews (Appendix 2) was to understand the micro-financial services provided to coffee farmers in the local context. Semi-structured interviews were conducted with 6 local microcredit institutions. They included open-ended questions concerning basic information about the MFI, lending conditions, conditions for payment, interest rate, additional services, system of control and conditions for default payers. Obtained data were used as complementary information for data collected from the coffee farmers.

Among the 6 interviewed institutions were:

- FINCAVER - Financiamiento al Campo Veracruzano S.A, de C.V.
- Asiversa - Agroindustrias y Servicios Integrados de Veracruz S.A, de C.V.
- Caja Popular Mexicana
- Caja Yanga
- Financiera sumate
- Cooperativa de Mujeres Cafetaleras Independientes (COMUCAFI)

It is important to point out that last two MFIs did not lend to any respondent of our sample.

The data collection was conducted in autumn and winter 2016. It is important to mention, that the collected data provided us with information about our sample group. In order to be able to generalize the data, we would need a higher number of respondents and we would have to apply different sampling method (random sampling) to obtain representative data for the whole region or state.

5.3 Methods for Data Analysis

The primary data obtained from the survey were analyzed using descriptive statistics and regression analysis. Descriptive statistics is used to address the first and second specific objectives. Regression analysis is used in order to achieve the third specific objective.

To fulfill the first specific objective - the description of the farming system developed in coffee production in the investigated area - there were presented socio-economic variables such as: sex, age, marital status, number of children, education and variables related to the production: size of the land, plants density, labor force, use of higher technological inputs and output levels of the two farmer's groups (with and without micro credits).

The second specific objective – the description of the role of microfinances in the context of other financial instruments - was analyzed based on variables such as: loan size, interest rate, payback period, number of loans and additional services provided by MFIs.

To analyze the third specific objective - the relationship between microloans and income generated from the coffee production (revenue) - a linear regression model (equation 1) was applied. In this model *Farm income 2016* was a dependent variable. Fourteen independent variables were considered. These variables are presented in Table 2 below. An independent variable of our highest concern was *Loan 2016* which was used to prove the effect of it on the income generated from the coffee production.

Among other independent variables were: interest rate, farm income 2015, number of plants grown per 1 hectare, share of production being processed, cost of higher technological inputs used such as fertilizers, herbicides and insecticides, number of employees and seasonal workers, governmental subsidies, and unit vectors such as off-farm income and level of education. These variables represented either inputs to the production or important factors influencing the level of production and for that reason were considered in the model. In addition, there was incorporated dynamic effect

through one lagged variables in the model: Farm income 2015 (lagged dependent variable) which indicated how much the farmers could invest in the production from the revenue of the previous harvest.

Table 2: Description of the Selected Variables

Dependent Variable	Units	Indication
Farm income 2016	MXN/ha	y_t

Independent Variables	Units	Indication
Unit vector	-	x_{1t}
Loan 2016	MXN/ha	x_{2t}
Processed prod.	%	x_{3t}
Interest rate	%	x_{4t}
Plants x ha	num./ha	x_{5t}
Farm income 2015	MXN/ha	$y_{(t-1)}$
Fertilizers	MXN/ha	x_{6t}
Herbicides	MXN/ha	x_{7t}
Insecticides	MXN/ha	x_{8t}
Family workers	num./ha	x_{9t}
Employees	num./ha	x_{10t}
Seasonal workers	num./ha	x_{11t}
Off – farm job	Unit vector	x_{12t}
Governmental subsidies	MXN/ha	x_{13t}
Education	Unit vector	x_{14t}

The whole econometric model is expressed in values per hectare in order to avoid a bias caused by different sizes of the fields.

Equation 1:

Econometric model:

$$\begin{aligned}
 y_t = & \gamma_1 x_{1t} + \gamma_2 x_{2t} + \gamma_3 x_{3t} + \gamma_4 x_{4t} + \gamma_5 x_{5t} + \gamma_6 y_{(t-1)} \\
 & + \gamma_7 x_{6t} + \gamma_8 x_{7t} + \gamma_9 x_{8t} + \gamma_{10} x_{9t} + \gamma_{11} x_{10t} + \gamma_{12} x_{11t} \\
 & + \gamma_{13} x_{12t} + \gamma_{14} x_{13t} + \gamma_{15} x_{14t} + u_t
 \end{aligned}$$

There were set 10 hypotheses addressing previously chosen variables. Eight of the hypotheses address eight of the variables individually. Another two hypotheses address three variables at once as they were expected to perform the same behavior in the model. These were higher technological inputs (fertilizers, herbicides, insecticides) and labor (family workers, employees, and seasonal workers). The hypotheses were either confirmed or rejected in the econometric verification of the model. The following hypotheses were subject to testing:

1. There is a statistically significant positive impact of micro loan acquired in 2016 on farm income generated in 2016.
2. There is a statistically significant positive impact of processing harvested production on farm income generated in 2016.
3. There is a statistically significant negative impact of the interest rate from the microloan on farm income generated in 2016.
4. There is a statistically significant positive impact of the density of the plants grown per one hectare on farm income generated in 2016.
5. There is a statistically significant positive impact of farm income from previous year 2015 on farm income generated in 2016.
6. There is a statistically significant positive impact of the use of higher technological inputs such as fertilizers, herbicides and insecticides on farm income generated in 2016.
7. There is a statistically significant positive impact of the number of workers such as family workers, employees and seasonal workers on farm income generated in 2016.
8. There is a statistically significant positive impact of the off-farm income on farm income generated in 2016.
9. There is a statistically significant positive impact of the governmental subsidies on farm income generated in 2016.
10. There is a statistically significant positive impact of the accomplished higher education on farm income generated in 2016.

Further, the estimated econometric model was verified according to the set assumptions. For the verification of the model, there were taken following steps. First of all, there

was verified the direction and intensity of the parameters of the explanatory variables on explained variable *farm-income 2016*. Secondly, there was evaluated a statistical significance of the estimated parameters and verified statistical significance of the whole model.

The independent variables were further tested on multicollinearity to verify whether there was existent linear dependence between two or more independent variables. High multicollinearity is undesirable in the model, as it does not permit to separate the effects of correlated independent variables on the dependent variable, in our case *farm-income 2016*. For that, it was used a correlation matrix. To estimate the parameters of the presented model we used Gretl software, version 2007c.

Furthermore, there was calculated average elasticity for the independent variable Loan 2016 in order to find out the intensity of its effect on the dependent variable Farm income 2016 expressed in percentage. The calculation was done using the standard formula:

$$E = \frac{\partial y}{\partial x_i} \frac{x_i}{\hat{y}}$$

where y refers to farm average income (revenue) and x_{mc} to the average taken micro-credit.

In addition, there were performed two simulations. The aim of the first one was to analyze the rate of return (ROR) on the loan investment and the benefit-cost ratio (BCR). The aim of the second simulation was to analyze the net income effect in relation to the interest rate and loan return in relation to the interest rate. In both simulations, there were considered two types of interest rates related the whole lending period. Effective interest rate which assumes that farmers pay each month the agreed monthly interest rate on the initial loan amount. And accumulated which does not assume monthly interest payments and thus interests add to the loan each month. The loan and the accumulated interests are repaid at the end of the lending period.

5.4 Limitations

There were several limitations to the study related to the quality and quantity of the collected data during the data collection in autumn and winter 2016.

Limitations related to the quality of collected data:

1. Coffee production in the last years was affected by coffee rust, a fungus called (*Hemileia vastatrix*) (Figure 6), a disease devastating coffee plantation and resulting in huge losses in the production (CEFP, 2001). Due to this limitation, the output levels were naturally lower than under normal conditions.
2. Subjective character of the data: The reported data were not obtained from farm management or book keeping records but from interviews with farmers. The respondents in the farm surveys often did not use records of their business activities (purchases of inputs, sales of the produce and the support) to answer the questions; therefore the accuracy of the responses is limited.

Limitations related to the quantity of collected data:

1. Safety concerns in the region: the political tension rose in the study area at the time of data collection. Gasoline prices began to rise causing many of the citizens to riot. It made the area unsafe and therefore limited the possibility of data collection.
2. Limited transportation between sites: the time for collection of the data was constrained due to the remoteness of the rural study areas. Collecting data was possible only during the daytime, as it was not recommended to the researcher to travel to the rural remote areas in late hours. Relying only on public transportation and due to the long distances between sites, therefore limited the time designed for the data collection.
3. Limited accessibility to the coffee producers due to the harvest season: A collection of the data was conducted in the months of harvest period of coffee, it was therefore very difficult to find interviewees in their household during the daytime.

RESULTS

According to the methodology the data were, first of all, analyzed based on descriptive statistics in order to address the first and second specific objectives - to describe the farming system and to describe the role of microfinance. The third specific objective - to analyze the relation between microloans and income generated was examined based on correlation and regression analysis. Again, it is important to mention that the collected data provided us with information about our sample group and we cannot, therefore, generalize the information on the whole region or state.

5.5 Description of the Farming System

As pointed out earlier, Veracruz is the second most important state in Mexico in coffee production (USDA, 2017), where 80% of coffee farmers are dedicated solely to production of coffee (Sagarpa, 2013). The agro-climatic characteristics provide very diverse conditions for the farmers in the central part of the state of Veracruz. The altitude varies from 0 to 3000 meters above the sea level, the average annual temperature ranges from 12° C to 24° C and the annual precipitation oscillates between 1000 and 3000 mm. Such inter-annual variability can affect potential for quality and yields of grown coffee even within one region (Sagarpa 2013).

Coffee farmers in Veracruz are small-scale farmers landholding about 2 hectares each (Sagarpa, 2013). As mentioned earlier, many communities in Veracruz during the power of INMECAFE were encouraged to produce coffee as a mono-crop. Until now coffee regions are characterized by low crop diversification (Equalexchange 2008). That was also verified in the field when all of the interviewed farmers considered coffee production as their primary and often the only economic activity. Coffee farmers neither raise animals to diversity their production. Coffee is mainly produced in a traditional way when trees are grown in the coffee plantation in order to provide plants with shade (Sagarpa 2013). According to Fira (2016) the average production/ha in Veracruz in 2012/2013 was 2.5 tons/ha. However, due to Roya there was a drop in the production and in 2015/2016 the average production decreased to 1.5 tons/ha. Coffee farmers usually sell their coffee without any further processing. It is important to add that all the

farmers are market-oriented, that means that at least 90% of their production is sold on the market.

5.5.1 Demographics

As it was mentioned previously in the methodology, there was gathered data about 90 coffee producers (60 of them having a credit, 30 of them not having a credit). This data can provide us with a certain image of current coffee producers in the study area. The demographic characteristics with respect to the sample division are described in Table 3 below.

Table 3: Demographic of the sample: Borrowers group; Control group

Key Characteristics	Borrowers group (%) N=60	Control group (%) N=30	Total (%) N=90
Age			
< 50	40	40	40
51 - 70	48	43	47
> 70	12	17	13
Marital Status			
Single	18	2	13
Married	65	67	66
Divorced	2	3	2
Widowed	12	27	17
Other	4	0	2
Number of Children			
0	10	3	8
1-2	23	27	24
3-5	42	53	46
6-8	22	10	18
>9	3	7	4
Literacy			
No education	20	13	18
Elementary School	50	47	49
Junior High school	10	27	16
High School	12	3	9
BSc.	8	10	9
Mr. +	0	0	0

Among interviewed coffee producers there were 26 women and 64 men. As it can be observed the average age was 55.5 years reflecting the unattractiveness of the agricultural sector among young people. Forty per cent of the total sample was represented by the most economically active ones (18 – 50 years old); forty-seven per cent belonged to the middle age group (51 – 70 years old); the remaining thirteen per cent were 70 years old or more.

Most of the respondents (66%) were married. There was a higher number of widowed respondents in the control group (27%) compared to 12% of the borrowers group. This phenomenon can be related to a higher number of elderly people in the control group. Forty-six per cent of all respondents had 3-5 children. Twenty-four per cent had 1-2 children and 18% per cent had 6-8 children. In the borrowers group compared to the control group were observed more childless respondents.

Eighteen per cent of all respondents have never attended school or have not completed elementary school. Forty-nine per cent completed elementary school, which is attended by students from 6 to 12 years, while sixteen per cent completed junior high school (12-15 years), nine per cent high school (15-18 years) and nine per cent completed some higher education. The percentage of producers without any education was higher in the borrowers group (20%) than in the control group (13%). Within our sample it was observed that 40% of the control group attained higher education than elementary compared to 30% in the borrowers group.

Further, it was found that the average producer's experience in coffee production was 33,6 years. Only 5% of the borrowers group and 7% of the control group had less than 10 years of experience. Most of the producers own their farms within the family throughout generations and that's why they get involved in the production from an early age.

5.5.2 Production

Coffee producers in the studied area are small-scale producers with an average size of the land between 2 – 3 hectares. Over a half of the sample in both groups own a cultivated land smaller than two hectares. A big part of the producers in the borrowers

group (30%) owns between 1-2 hectares. In case of the control group, most of the farmers (37%) own less than one hectare. See Figure 10 below.

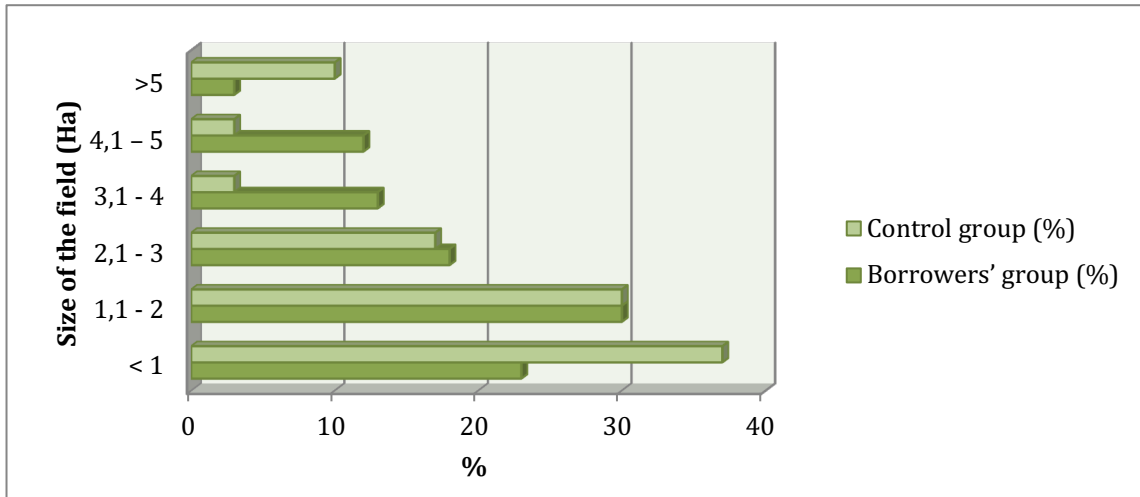


Figure 10: Land size

The number of plants grown per one hectare was in more than 40% of cases between 1501 – 2500 for both borrowers and control group. In a second place, farmers grew less than 1500 plants per one hectare. See more in the Figure 11 below.

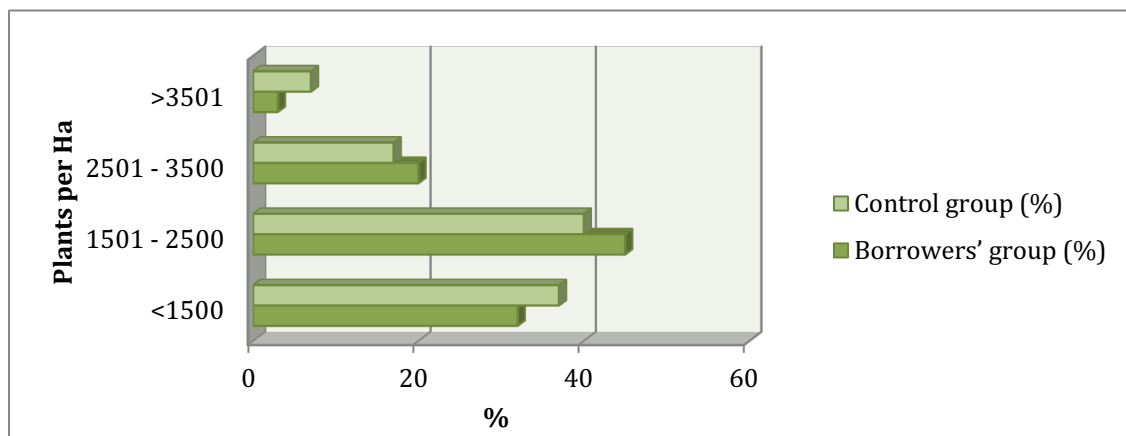


Figure 11: The density of plants per 1 hectare

As it was already mentioned a disease ROYA caused a destruction of many coffee plants. For that reason, Mexico's Agricultural Ministry SAGARPA started to distribute certified plants for free to the coffee producers. In Figure 12, we can, however, see that there were much more receivers in the borrower's group than in the control group (40% of the control group did not receive any plants).

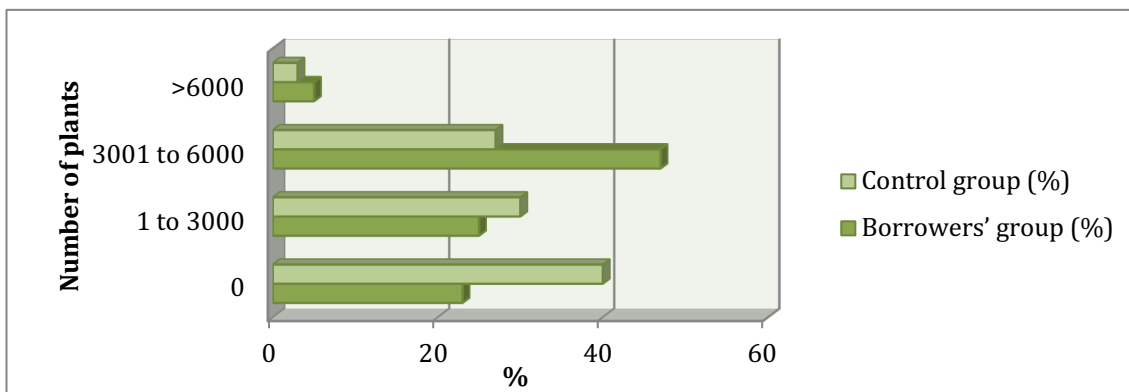


Figure 12: Number of plants received from SAGARPA

A family workforce was crucial for running farm activity especially for farmers in the control group. There was found in 64% of the cases more than 1 family member/ha who was involved in the farm activities. On the other hand, in the borrowers group, 60% of the farmers employed less than 1 family member/h. Further, it can be observed that 73% of the farmers in the control group did not hire any external labor/ha throughout the year. Farmers in the borrowers group, on the other hand, use at least 1 employee/ha in 50% of the cases. More common is hiring external labor during the harvest season when just less than 20% in both sample groups did not hire any harvesters or pickers/ha.

Use of fertilizers is essential for good yield in the coffee production. As it can be observed in Figure 13 below, more than 90% of the producers from both groups use fertilizers in their production. Concerning the use of herbicides, there is a difference between these two groups. Producers from the control group use herbicides much more and it is in 40% of the cases. Insecticides are not that commonly used by farmers in both groups, roughly only in 17,5% of the cases.

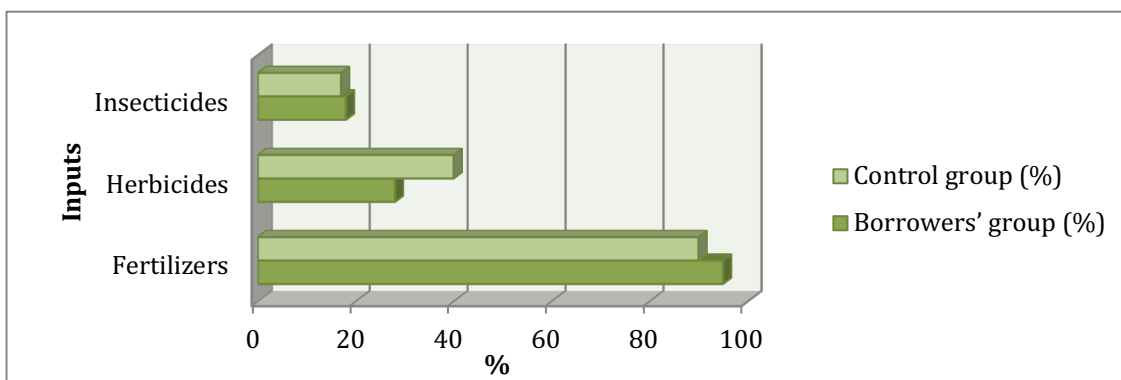


Figure 13: Use of fertilizers, herbicides and insecticides

From the Figure 13, it is visible that most of the farmers in both the borrowers and control groups use fertilizers. The amount of it however differs. The average use of fertilizers in the borrowers group is 8 packages of 50 kg (400 kg) per hectare. In the control group, it is less, only 5 packages of 50 kg (250 kg) per hectare. Further, it can be observed in Figure 14, that 40% of the control group uses between 1 – 6 packages/hectare compared to the borrowers group where 42% of the farmers use 7-12 packages/hectare.

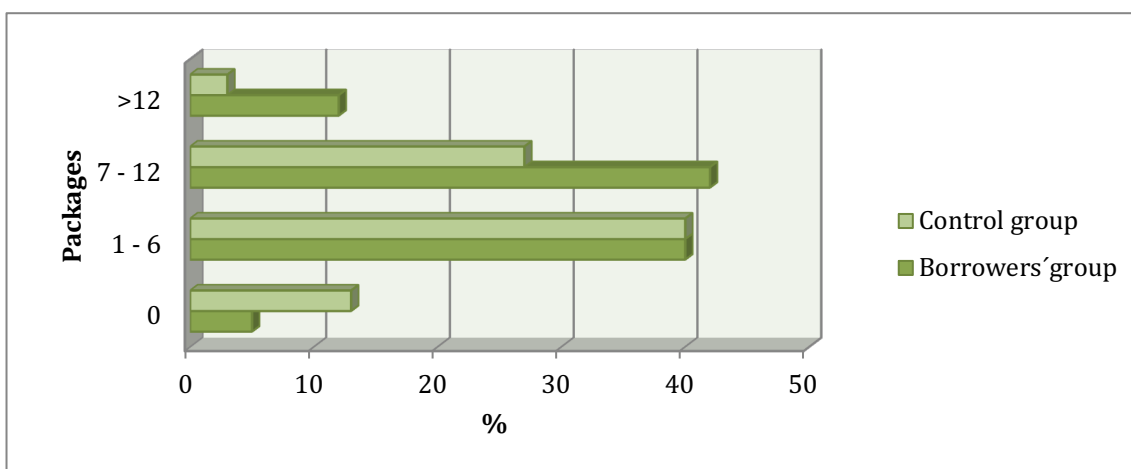


Figure 14: Use of fertilizers per hectare

Concerning the average production of coffee (coffee cherries) per hectare between the years 2013 and 2016, as it is visible in Figure 15, borrowers group had maintained higher output levels compared to the control group. The production hit the bottom for both groups in 2015 due to the disease Roya. The volume of production is expressed in quintals, 1 quintal of coffee cherries equals approximately 250 kg. As it can be further observed in Figure 4 in the section 2.3.2 the production on the state level as well as at a national level was decreasing since 2013 and was estimated to be in decline until 2016. On our sample group, we can, however, observe that in 2016 there was already registered an upswing in the production. See Figure 15.

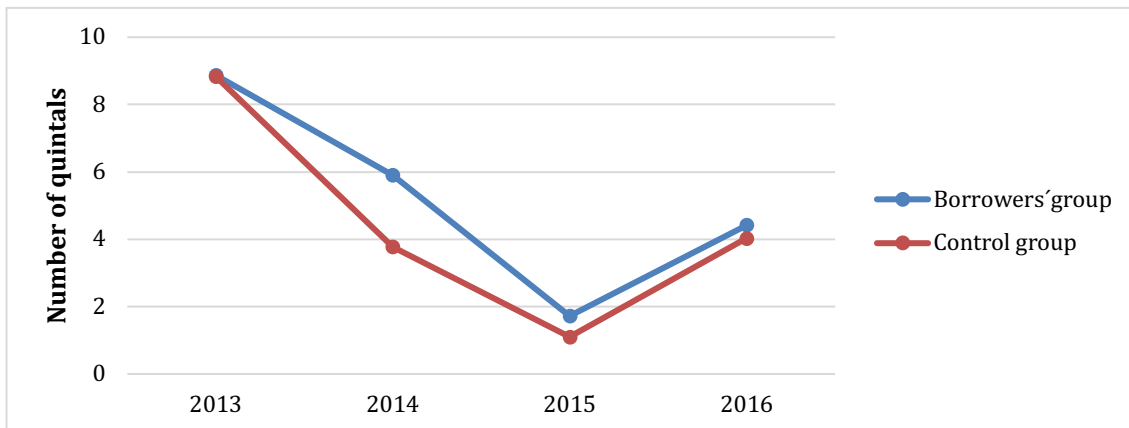


Figure 15: Average production per hectare (own calculation based on the sample)

Coffee producers can either sell coffee cherries just after their harvest or they can further process them if they own relevant machineries. Processing coffee can add an extra value and therefore increase farmers income. Most commonly used and owned machinery is a pulping machine which separates the skin from the coffee bean. Additionally, some of the producers, further roast and grind the coffee beans before selling it. It was found out that more than half of the borrowers group process coffee cherries compared to the control group where 77% of the producers sell the production just after harvest. Obtaining fast money by selling it just after the harvest is often a reason for not processing the coffee.

As it was said not only the volume of production indicates the level of income but also the added value which can producers aggregate to the pure harvest. In figure 16 below it can be observed that gross income, without considering any costs of production was for 63% of the farmers in the control group lower than 10 000 MXN/ha compared to 40% of the farmers in the borrowers group. Another 51% of the farmers with credit obtained more than 10 001 MXN/ha compared to 30% of the farmers without credit. See Figure 14.

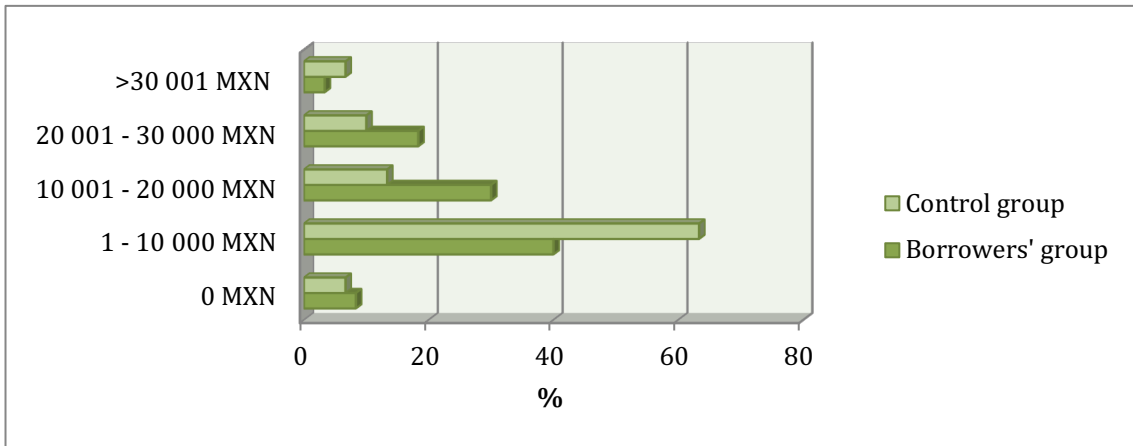


Figure 16: Income/ha

In Figure 17, it can be further observed, that gross margin, which was calculated as gross income reduced by credit costs (loan and interests) that 25% of the credit borrowers fell into deficit due to high credit expenses. Another 70% of the credit borrowers maintained their balance in surplus.

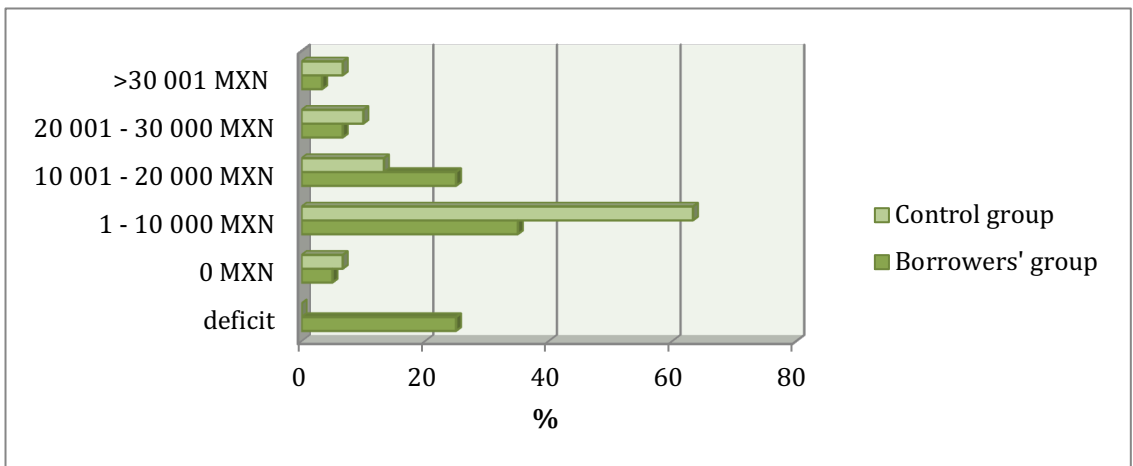


Figure 17: Gross Margin/ha

Due to the current situation, income from coffee production became an insufficient source of money for many farmers to maintain their households. The numbers showed that producers from the borrowers group had to seek for another off-farm job in 30% of the cases. In case of the control group, 63% of the producers found another off-farm job.

5.6 Microfinance services in Veracruz, Mexico

The state of Veracruz is among the two states in Mexico with the lowest financial inclusion. Veracruz has the lowest number of customer service desks, which equals to 0.7 per 10 000 inhabitants. In 2016 Veracruz still had a municipality with more than 51 000 inhabitants, where no banking branch was situated. Also, there were two municipalities with more than 37 thousand inhabitants with no ATMs available. In addition, the number of voluntary individual savings in Veracruz is one of the lowest in Mexico as there are only 5 contributions per 10 000 adults (CONAIF 2017). Nevertheless, Veracruz is one of 5 states in Mexico with a highest number of micro financial institutions (Bautista 2015).

The sample group of farmers was concentrated around three important cities: Xalapa (capital city), Córdoba and Coatepec, where several micro financial institutions are located. Poor infrastructure between farms and bigger cities may be an obstacle when farmers want to get a loan. The Table 4 below shows the distances which farmers must overcome to get to the above-mentioned cities. As we can see, 50% of the farmers from the control group did not acquire any credit despite the fact that they live very close to the urban centers. In contrast, 28% of the farmers from the borrowers group come from the most distant village Cosautlan. These farmers obtained loans thanks to group lending provided by one MFI.

Table 4: Farm location

Farm location	Distance (in km)	Duration (in minutes)	Borrowers group (%)	Control group (%)
1. Colónia Úrsulo Galván	5,9	14	13	20
2. Las Lomas	8,1	21	7	20
3. Pacho Viejo	8,5	16	27	17
4. Xico	9,4	22	3	0
5. Chiltoyac	13,1	33	2	0
6. San José Loma Grande	17,2	36	20	27
7. Cosautlan	27,3	1h 5	28	17

Borrowers of the studied sample were clients of 8 local/national MFIs (Figure 18). Most of the respondents were clients of Asiversa or Fincaver which are sister organizations operating only in the region.

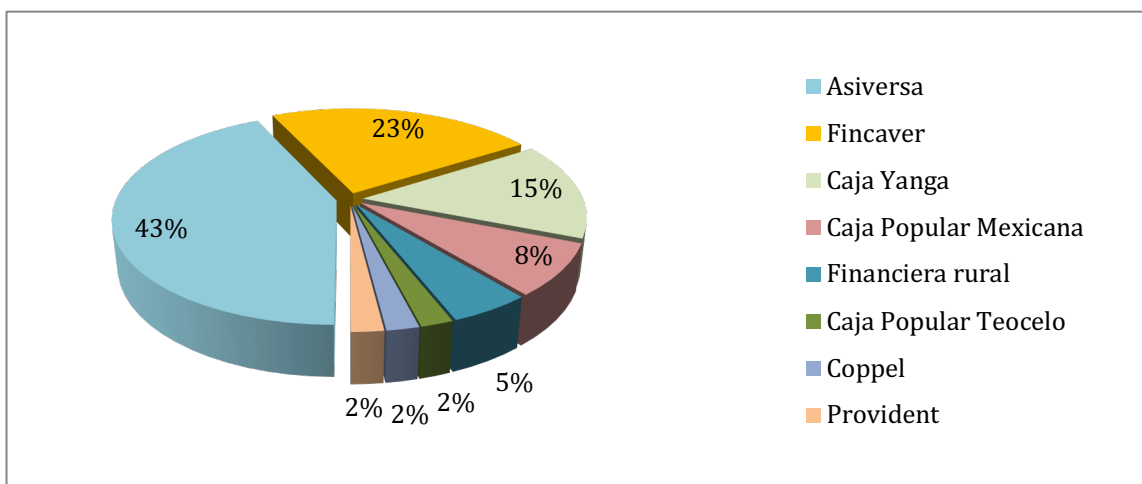


Figure 18: Microfinancial institutions

Asiversa

The majority of the borrowers (43%) were clients of MFI Asiversa. Asiversa operates under a non-profit organization Regional Coffee Council of Coatepec (Consejo Regional del Café de Coatepec), which indicates that its' clients are exclusively coffee producers. Asiversa does not provide only microloans, but also capacity buildings and trainings related to the production of specialty coffee. Loans are provided to individuals either for regular investments (for 1 year) into the production with interest rate 24% p.a. The quota for credit amount is 6000 MXN/ha (maximum 3 hectares). For bigger investments related to the renovations of the farms (for 4-6 years) are provided credits with 30% p.a. Asiversa further operates as an intermediary. It buys coffee from the producers for a favorable price and sells it on the market. In addition, Asiversa distributes technological packages to the farmers which are provided by the government for free. Asiversa is popular among the producers not only due to relatively low interest rate but also thanks to its friendly attitude towards the clients and the community-based approach.

Fincaver

Another 25% of the borrowers were clients of Fincaver. This small organization is another entity of the Regional Coffee Council of Coatepec. Its' main objective is to create a competitive development by promoting differentiated coffee and through a provision of loans to the small and medium coffee producers. Nowadays it has around 800 associates out of which 100 have currently acquired micro credit. Fincaver focuses mainly on producers in distant rural areas, that is why it manages only group lending. Loans provided again only to coffee producers for inputs 1 year or max. 3 years for farm renovation. The maximum loan amount is 10,000 MXN and is accompanied by 36% interest p.a. Fincaver also offers additional services such a distribution of technological packages from the government, commercialization – buying up for an advantageous price and optional courses such as good practices in agricultural.

Caja Yanga

Caja Yanga is a large cooperative society providing savings and loans to around 100 000 associates at a national level. From the borrowers sample, 15% were clients of this cooperative. Loans at Caja Yanga can be acquired for any activity either in agriculture or for business purposes or others. Loans are provided to the associates individually or in groups depending on if they are from distant rural areas or not. Interest rates again differ, whether it is a group or an individual loan. Borrowers in groups are charged 33% p.a. The size of the loan is based on the capacity of payment of every individual. The payback period is up to 36 months for loans up to 100,000 MXN. Interest rates for individuals differ. Individual borrowers who saved at least 80% of the loan amount pay 18% and those who don't have any savings nor guarantor are charged 42% p.a. Caja Yanga does not provide their associates any additional services such as capacity buildings, training, etc.

Caja Popular Mexicana

Even bigger cooperative than Caja Yanga accounting for 2 million associates at the national level and 5.000 in the region. From our sample, 8% were clients of this MFI. Caja Popular Mexicana provides credits to the associates based on a previously saved amount. Credits are provided for agricultural activities (30%), as well as for investments in business or others (70%). The loan size can start from 1,000 MXN up to an indefinite

amount, but only if the associate had previously saved 10% of the borrowed amount, otherwise he or she has to demonstrate the ability to pay. The payback period for microloans in coffee production is maximum 1 year. There is interest rate 27.36% p.a. for group loans and interest rate 15.96% p.a. for individual associates who are in the cooperative for more than 2 years. Caja Popular Mexicana offers additional free services such as business training, workshops, financial advisory, etc., however, the attendance is very poor.

Financiera rural

Financiera rural is a rural development bank of the Federal Government. Its' official objective is to create an efficient rural financial system that facilitates access to credit in order to contribute to the rural development (Gob.mx Not dated). From our borrowers sample, there were 5% of respondents who were clients of this MFI. The interest rate they stated to pay was 9% p.a.

Caja Popular Teocelo

A cooperative providing to its associates saving and loans for agricultural production and business activities (Caja Popular Teocelo, 2017). The required interest rate for loans in this cooperative is 21.6%. From our borrowers sample, only 2% were clients of Caja Popular Teocelo.

Coppel

Another 2% of the borrowers sample were clients of Coppel. Coppel is one of the largest department store chains in Mexico selling furniture and articles for home. Coppel is known for offering easy credit for goods and also a personal credit for undefined purposes. They do not offer any credit, especially for agricultural purposes. (Reference for Business, Not dated). The interest rate is 40.68 p.a.

Provident

It is the third largest microfinance institution in Mexico, operating in more than 25 states. It provides either immediate loans: from \$2 000 to \$10 000 without any collateral or business loans from \$10 000 to \$30 000 for bigger investments (Provident, 2017). The interest rate paid by our respondent was 30% p.a.

In our sample group, there were 45% of individual borrowers and 55% of farmers who received credit in a group. A number of loans acquired by one farmer differ a lot. In our sample, there were farmers who were long-term micro financial borrowers as well as farmers who asked for credit only once. Thirty per cent of our respondents received more than 6 loans in the past years out of which 18% received between 11 to 20 loans. Those respondents who acquired only one loan did so mainly as an implication of the Roya epidemic which hit the region hardest in 2015. See Figure 19 below.

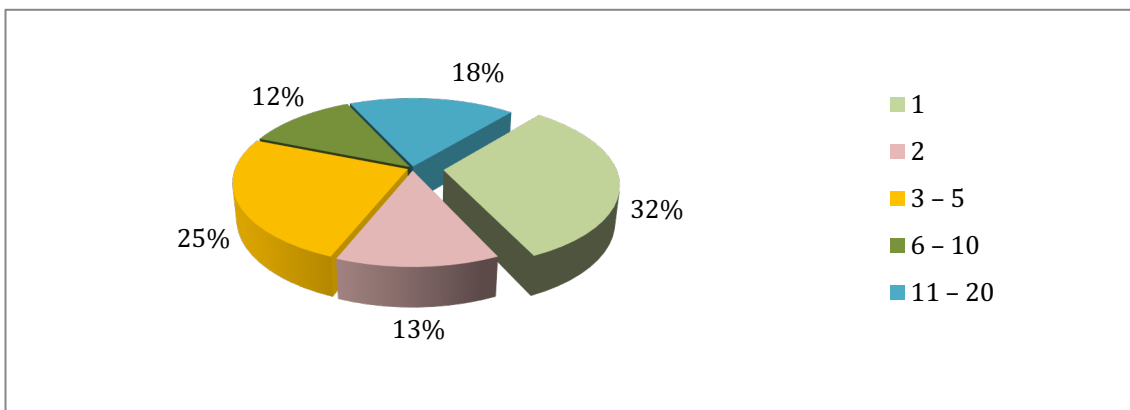


Figure 19: Number of loans acquired

The payback period for microcredit in coffee production is mostly in one year but can be longer. Loans which are used for variable inputs are provided for a period of one agricultural cycle (1 year) which begins in spring after the harvest and finishes the following year again after the harvest. If the farmer needs bigger amount for farm renovation or to purchase new machineries, there are loans with longer pay off period for 2 years or more. In our case, 68% of the loans were provided for one year. It means that farmers mostly take loans to cover their variable costs. See Figure 20 below.

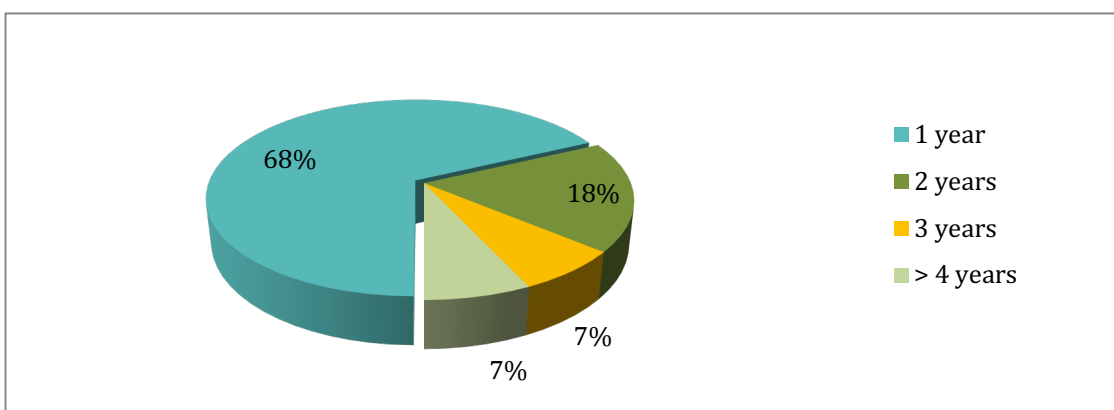
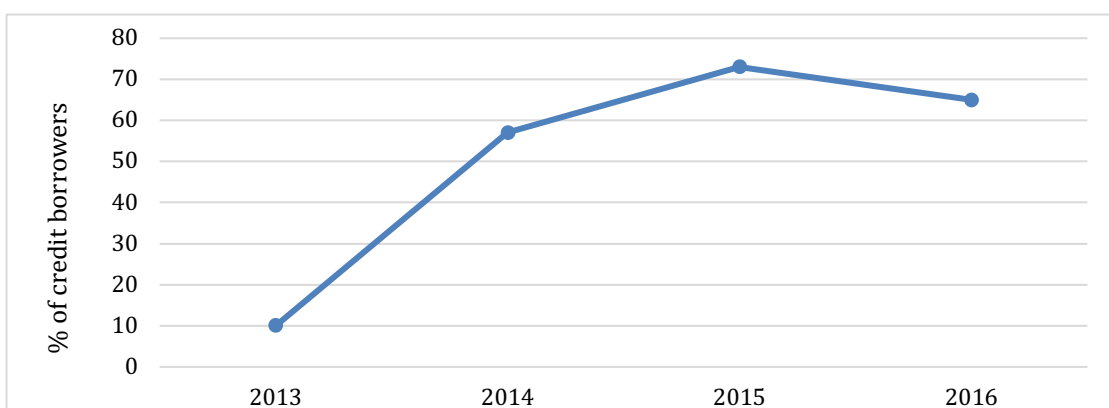


Figure 20: Payback period

Loan repayment depends on the rules of every MFI. Nevertheless, clients in our sample group could usually choose the frequency of loan repayment according to their needs (every month/ 3 months/ 6 months/ etc. or only once after the harvest). Farmers who are not able to repay their loans have to pay late payment interest from 2% (in Caja Popular Mexicana) up to 6% (in Caja Yanga) and their names are further reported to credit bureau where are listed all credit information such as person's previous loan performance. For a person with a negative credit history, it is very hard to get another credit in any other financial institution. This does not apply if the reason for not repaying the loan is a natural disaster, in our case the disease Roya. In such a case, borrowers can prolong their credit and payback to a newly established date without any extra charge just with regular interest.

The maximum loan size coffee producers can ask for is different in every MFI. Some MFIs evaluate every borrower individually based on their credit history, ability to pay and considering the fact whether they have a guarantor or not. In some MFIs, they have established a general maximum limit for everyone and for instance, in micro financial cooperatives, every associate has to firstly save money and afterward he or she can acquire a loan devolved from the amount saved. In Figure 21 below it can be observed that most farmers got a loan in 2015 and 2016 (73%; 65% respectively). As it was already mentioned, the reason for borrowing money in those years was mainly lack of income from the coffee production caused by Roya epidemic.



*Figure 21: Percentage of credit borrowers between 2013-2016
(own calculation based on the sample)*

The total amount of credit most of the farmers obtained in all studied years was between 5 001 – 10 000 MXN. In Figure 22 below it can be further observed that the loan size per 1 hectare which most of the borrowers acquired in 2015 and 2016 was between 2 501 – 5 000 MXN. In 2014 it was 10 000 MXN/ha and more.

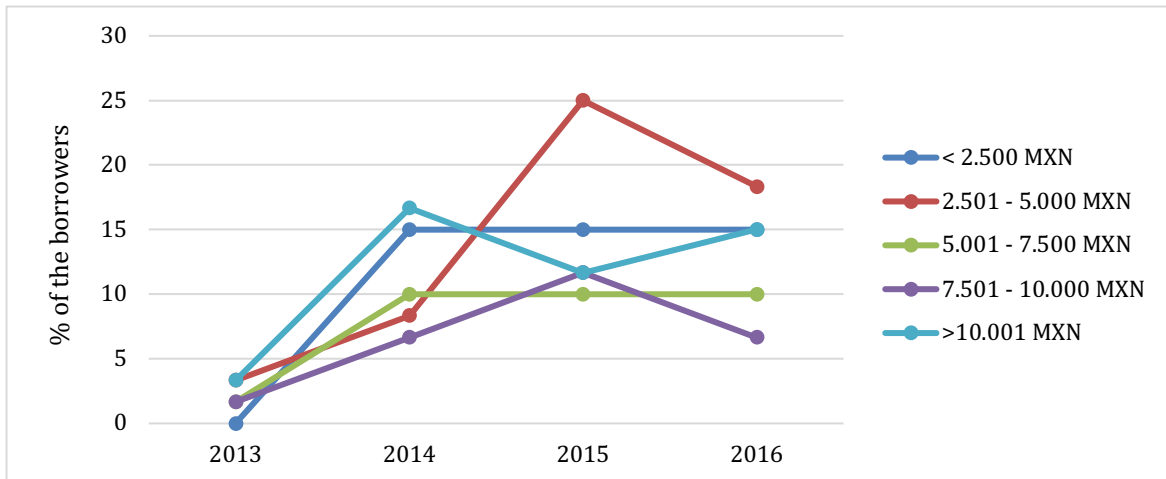


Figure 22: Loan sizes/ha (own calculation based on the sample)

From 2005 till 2017 the average interest rate in commercial banks in Mexico was 5.41% p.a., reaching the highest peak of 9.25% p.a. in 2005 and the bottom line of 3% p.a. in 2014. In 2015 and 2016 when most of the farmers from our studied group acquired a loan, the interest rate remained on a level of around 3% p.a. (Trading Economics, 2017). The interest rate most of the farmers from our sample group (95%) agreed to pay for microloans was higher than 20% p.a., hence incomparably higher than in a commercial bank. See Table 5.

Table 5: Interest rate

Interest rate (p.a.)	Borrowers (%)
< 20%	5
20.1% – 30%	53
> 30.1%	42

As it was already mentioned some MFIs provide their clients with additional services such as training, technical support, intermediary service, etc. See Table 14. Majority of the interviewed borrowers (70%) received technical support from their MFI as an accompanying service. Forty-two percent of the borrowers attended training organized

by their MFI and the same percentage sold coffee to their MFI as they offer more competitive price compared to the local intermediaries. See Table 6.

Table 6: Accompanying services

Type of services	%
Technical support	70
Training	42
Intermediary service	42
Other	7

Based on the 6 semi-structured interviews (out of 2 were not credit providers of our sample group) there was collected information concerning the tools MFIs use to control their clients. First of all, it was found out that 5 organizations run regular monthly meetings for their clients/associates. In the bigger MFIs such as Caja Popular Mexiana or Caja Yanga the meetings are held in order to provide information about credit, payments, payback periods, etc. Smaller local MFIs which are exclusively focused on the provision of credit to coffee producers such as Asiversa and Fincaver moreover use these meeting in order to inform about the harvest, market prices, and sales. In some MFIs of a cooperative type such as Caja Popular Mexicana or COMUCAFI they also dedicate these meeting to talks about cooperativism and solidarity-based economy. Meetings are mostly obligatory, but usually, nobody is fined for not participating except some groups under COMUCAFI, where it depends on an individual decision of the groups.

Concerning supervision of the clients, MFIs usually do not control the credit allocation. An exception is Caja Popular Mexicana, where a responsible person controls credit allocation on a regular basis (every month or two) as well as Asiversa where however this control happens occasionally. In case of Fincaver and Caja Yanga, where loans are provided in groups, it is assumed that members of the group control one to each other.

As it was already addressed in the theoretical part of this study, microloan borrowers are often related to a moral hazard for misusing the loans. Microloan borrowers from our sample were asked directly whether they also use loans for other purposes or not. The 73% of the answers denied that such situation happened compared to the 27% of the

answers confirming this phenomenon. Those who admitted it indicated that they spent the credit on food, schooling, and health. Also based on the interviews conducted with MFIs it was found out that the number of default payers is usually between 3% to 30% (at Asiversa and at Financiera summate, respectively). The most commonly presented problems are low prices, sickness in the family and unfavorable natural conditions. Payment default caused by Roya disease is often resolved by offering a new credit for the outstanding payment.

Results further showed, that 30% of the control group did not acquire credit due to fear of running into a debt. Another 13% of the farmers stated that they would not have sufficient recourses for debt repayment and another 13% that they do not need it. Ten percent of the farmers did not use credit due to lack of information and another 10% due to unstable production. See Figure 23 below.

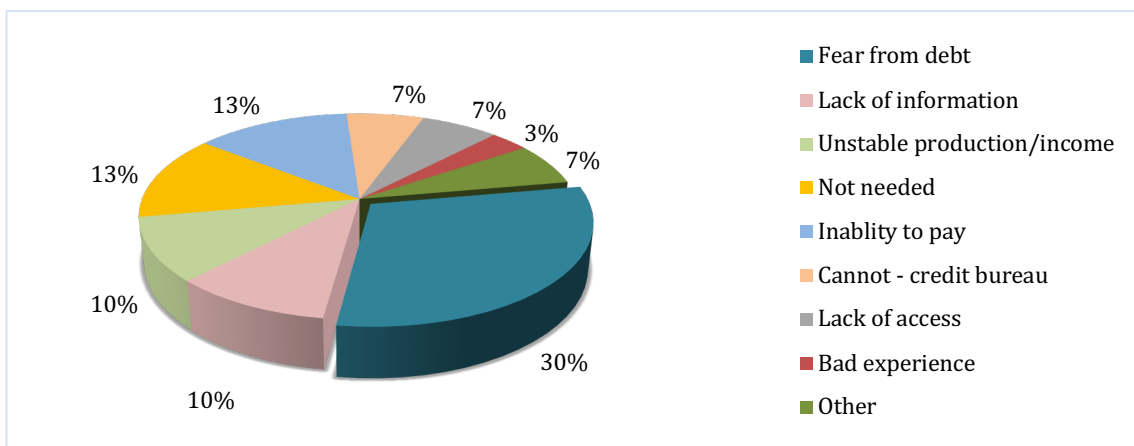


Figure 23: Reasons for not having credit

5.7 Relation Between Microloans and Income (revenue)

We used a linear regression model (Equation 1), in order to address the third specific objective: i.e. to analyze the effect of microloans and other factors on farm income (revenue). The list of variables entering the model is presented in the first column of Table 7. Initially, we applied the model to all 90 observations, however, one outlier was finally dropped thus we used 89 observations.

Table 7: Model – Regression analysis of determinants of income

Variable	Coefficient	p-value
Processed prod.	8513.59	0.0019***
Gov. subsidies	2.11217	0.0034***
Off-farm job	-5031.40	0.0080***
Fertilizers	-0.989719	0.0025***
Loan 2016	0.386611	0.0122**
Education	1904.30	0.0217**
Insecticides	14.1483	0.0138**
Family workers	-1029.85	0.0268**
Herbicides	-12.0400	0.0685*
Farm income 2015	0.259167	0.0856*
Employees	649.486	0.3965 NS
Seasonal workers	810.389	0.1121 NS
Plants x ha	-0.366124	0.1023 NS
Interest rate	-28.0380	0.6567 NS

Note: *** - 1% level of significance, ** - 5% level of significance, * - 10% level of significance, NS Not significant

Outcomes from the model (Table 8) showed that microloans obtained in 2016 had a positive significant impact on farm income generated in 2016 ($p < 0.05$). Increasing loan by 1 MXN would increase income by 0.386611 MXN/ha, ceteris paribus. The hypotheses about statistically significant positive impact can be therefore confirmed.

Obtained results further showed that processing production and governmental subsidies had a significant positive impact on generated income ($p < 0.01$). One percent point increase in processed production would result in 8513.59 MXN/ha increase in income, ceteris paribus. Increasing governmental subsidies by 1 MXN would increase income

by 2.11217 MXN/ha, *ceteris paribus*. The hypotheses related to processing production and governmental subsidies can be confirmed. On the contrary, it was found out, that off-farm job and fertilizers had negative significant impact ($p < 0.01$) on income. Having an off-farm job would decrease income in 2016 by 5031.40 MXN/ha, *ceteris paribus*. And also increasing investment into fertilizes by 1 MXN would decrease income by 0.989719 MXN/ha, *ceteris paribus*. Hypotheses related to off-farm job and fertilizers must be therefore rejected.

Education and insecticides also proved a positive significant effect on the generated income ($p < 0.05$). Attaining one more educational level by the farmers would increase income by 1904.30 MXN/ha, *ceteris paribus*. Similarly, increasing investment into insecticides by 1 MXN would result in an increase of income by 14.1483 MXN/ha, *ceteris paribus*. Hypotheses related to education and insecticides can be therefore accepted. On the other hand, family workers showed negative significant relation towards generated fam-income ($p < 0.05$). Increasing number of family workers by 1 would decrease farm income by 1029.85 MXN/ha, *ceteris paribus*. Hypotheses concerning family workers must be rejected. Also, herbicides showed a negative significant impact on the generated income ($p < 0.1$). Increasing investment into herbicides by 1 MXN would decrease income by 12.0400 MXN/ha. Hypotheses related to herbicides must be therefore also rejected. Finally, farm income 2015 had a positive significant impact on the income ($p < 0.1$), which means that increasing farm income 2015 by 1 MXN would increase income by 0.301466 MXN/ha, *ceteris paribus*.

The rest of the variables such as employees, seasonal worker, plants x ha, interest rate were not statistically significant. For that reason, the level of income in 2016 cannot be expressed as a function of them. Hypotheses related to these variables must be therefore rejected as a significant relation to the income was not verified. Following equation (Equation 2) therefore includes only variables with statistically significant parameters:

Equation 2:

$$y_t = 0.386611x_{2t} + 8513.59x_{3t} + 0.259167y_{(t-1)} - 0.989719x_{6t} - 12.0400x_{7t} + 14.1483x_{8t} - 1029.85x_{9t} - 5031.40 x_{12t} + 2.11217x_{13t} + 1904.30x_{14t} + u_t$$

The coefficient of determination was statistically significant at a confidence level of 95%. The p-value for F-test equaled to 5.46e-08, which is minor to the alpha level of significance ($\alpha = 0.05$). The variation of the dependent variable were explained by alternations of independent variables from 54% as the $R^2 = 0.540840$.

Further, there was made a simulation case where a rate of return (ROR) of the investment and the benefit-cost ratio (BCR) was calculated. As it was mentioned in the methodology, there were used two types of annual interest rates (effective, accumulated) and also information which is listed in Table 8 below.

Table 8: Input data for ROR and BCR calculation

Input data	
Loan amount	1 000 MXN*
Payback period	1 year*
Coefficient (marginal income)	0.3866
Interest rate (p.m.)	2%*
Effective interest rate (p.a.)	24%*
Accumulated interest rate (p.a.)	26.5%*

*marked information were randomly selected for purpose of the simulation model

Based on the calculation (Table 9 below), it was found out that in case of effective interest rate (24% p.a.), the revenue increases by 38.66% (386.611 MXN). After the reduction of the cost of the loan (250 MXN), the borrower obtains 146.6 MXN. The rate of return (ROR), therefore, equals to 15%. The gross benefit-cost ratio (BCR) equals 1.61 which indicates that benefits exceed costs by 61%. This model situation, therefore, proves that under these circumstances it is worth for the farmer to borrow money.

Similarly, in case of accumulated interest rate (26.8% p.a.), the revenue increases by 38.66% (386.611 MXN). After the reduction of the cost of the loan (268 MXN), the

borrower obtains 118.6 MXN. The rate of return (ROR), therefore, equals to 12%. The gross benefit-cost ratio (BCR) equals 1.44 which indicates that benefits exceed costs by 44%. This model situation therefore also proves that under these circumstances it is worth for the farmer to borrow money. However, the outcomes of ROR calculation show that effective interest rate is more favorable for the borrowers than the accumulated interest rate.

Table 9: Calculation of ROR and BCR

Indicators	Effective interest rate (24% p.a.)	Accumulated interest rate (26.8% p.a.)
Gross benefit	386.611 MXN	386.611 MXN
Increase of revenue	38.66%	38.66%
Cost of the loan (interest)	240 MXN	268 MXN
Net income	146.6 MXN	118.6 MXN
ROR	15%	12%
BCR	1.61	1.44

The outcomes concerning the Loan 2016 examined in the regression model at the beginning of this chapter were further analyzed based on the average elasticity calculation in order to express the relation between the independent variable Loan 2016 and dependent variable Farm-income 2016 in percentage. The outcomes from the average elasticity calculation can be observed in Table 10 below. The results showed that the loan elasticity equals to 0,147884142. That means, that if the average loan amount in 2016 was 1% higher, the average income (revenue) generated from the coffee production would increase by 0,15%.

Table 10: Loan elasticity

Average elasticity/ha	0,147884
Loan coefficient	0,386611
Average loan/ha	4146,356
Average income/ha	10839,75

Another simulation was conducted in order to analyze the maximum interest rate acceptable for the farmers. For that purpose, it was again assumed that the loan payback period was 1 year. In Figure 24 it can be observed the break-even point for the

accumulated interest rate which equals 2.75% p.m. and for the effective interest rate which equals to 3.35% p.m. Higher interest rates than these ones would therefore already bring a negative return on the acquired loan.

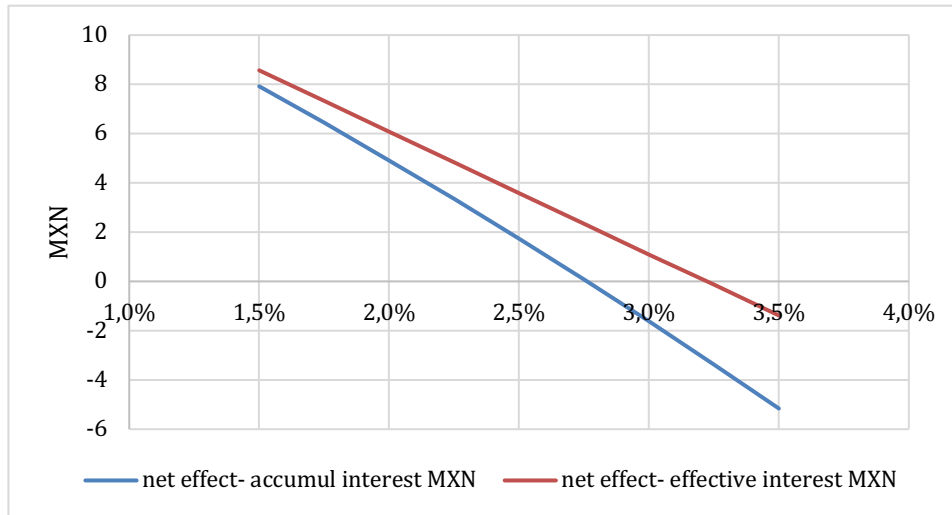


Figure 24: Net income effect in relation to the interest rate

In Figure 25 below we can see the loan return rate in relation to the interest rates. Again, it can be observed that with the interest rate 2.75 p.m. and 3.25. p.m. (effective and accumulated interest rates, respectively) there is no rate of return. If the loan was 1% higher the farmer rate of return for instance gain 8.8 MXN/ha under 1.5% p.m. effective interest rate.

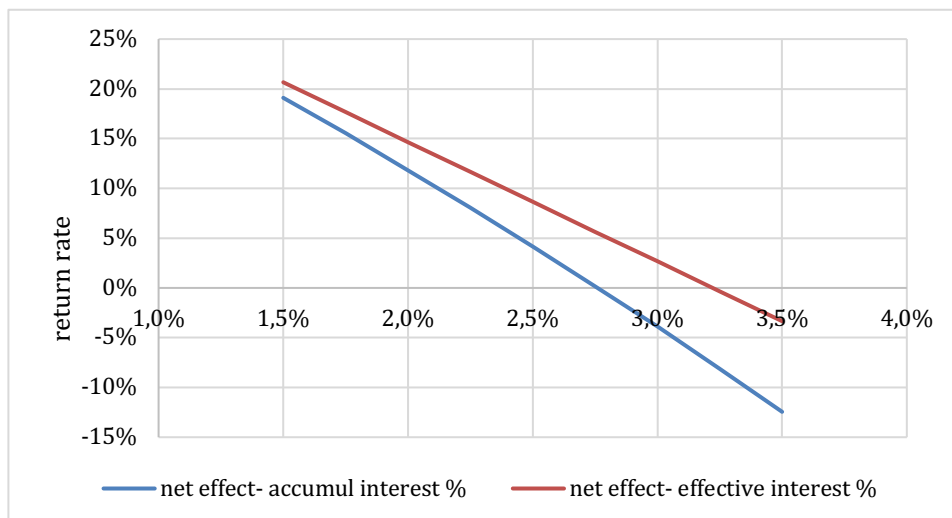


Figure 25: Loan return rate in relation to the interest rate

6 DISCUSSION

The discussion addresses again the first three specific objectives in their respective order, that means the coffee farming system, the role of microfinance for coffee farmers and the relationship between income, microloans and other factors.

6.1 Farming System

The collected data helped us to illustrate the main characteristics of the two farmers groups, with and without participation in MFI program. Again, based on the data from 90 respondents we were not seeking to make a generalization about the farmers' profile but rather to describe the main features of our study sample and to make a comparison between the two groups. In our sample group, more than 60% of the coffee farmers were men in both studied groups. This finding is consistent with the view of Adams (2010) who claims that men are more likely to go for credit compared to women. The average age of the farmers was 55.5 years which is quite high. It also confirms a study by Eakin et al. (2006) who compared coffee producers in Mexico, Guatemala, and Honduras and presented that Mexican farmers were the oldest with an average age of 52 years. Majority of the farmers in both groups were married (> 66%) and had 3-5 children. In the borrowers group there were observed more childless respondents.

Further, in the borrowers group, there were found more farmers with no education (20%) than in the control group (13%). Also, more farmers from the control group (40%) attained higher education than elementary school compared to 30% of farmers in the borrowers group. Contrasting data concerning the education of the farmers found Nosiru (2010) who reported that credit borrowers had higher education compared to non-credit borrowers. On the other hand, Girabi et al. (2013) found out that majority of the credit and non-credit respondents attained primary education and so there was not a significant difference between the two groups.

In both groups, most of the farmers cultivate land smaller than two hectares. In case of the control group there are more farmers (37%) with less than one hectare. It can be assumed that bigger farm size can be a factor influencing the decision making of

acquiring credit or not. The density of plants grown on 1 hectare was similar for both groups between 1501– 2500 in 40% of the cases. According to López-Castillo (2013) the ideal number of plants grown one hectare is 2 333 plants as it provides them with adequate space to give fruits.

In order to combat Roya disease which occurred in the coffee production, Mexico's Agricultural Ministry SAGARPA launched a program to help the coffee farmers. It supplied them with quality disease-resistant plants and provided them with technological packages (USDA 2017). Based on our data, the distribution was not done equally as much more receivers were in the borrower's group (77%) compared to the control group, where 40% of the farmers did not receive anything. The reason why is that MFIs often intermediate the delivery of subsidized plants to the farmers and their clients therefore have the advantage of obtaining them first.

Further, it was found out that the farmers in the control group employ more family members/ha compared to the borrowers group, which uses more external labor/ha. Study of Girabi et al. (2013) reports similar findings, which show that farmers who accessed credits were rather able to pay for hired labor. This may suggest that external labor depends on the producer's availability of capital what results in farmers without credit to be more dependent on the family labor.

Farmers in both groups used fertilizers in more than 90% of the cases, however the amount applied differs between the groups. The average use of fertilizers in borrowers group equals to 8 packages/hectare compared to 5 packages/hectare in the control group. It can be assumed that thanks to the financial resources from credit farmers apply more fertilizers. This goes in line with findings of Green & Ng'ong'ola (1993) who claim that access to credit by farmers may influence the use of fertilizers. Also, according to Nosiru (2010), microcredit may enable farmers to purchase inputs to increase their productivity. On the contrary, the use of herbicides prevailed between farmers in the control group in 40% of the cases. According to a study of Sagarpa (2013), there have been registered negative experience with the use of herbicides, such as soil degradation. Therefore, it may be assumed that non-credit receivers lack

information about the negative aspects of the use of herbicides compared to credit borrowers who have better access to information through their MFIs.

The average output levels in borrowers group were higher compared to the control group in all studied years. This phenomenon was also observed by Guirkingier & Boucher (2008) who found that credit constraints lead to decrease of agricultural productivity by 26% and by Nosiru (2010) who reported an increase of agricultural productivity for farmers with credit. On the other hand, the study by Pender et al. (2004) reported that there is a little evidence of the impact of access to credit on crop production. Further, it was observed that farmers from the borrowers group tend to process their coffee in more than 50% of the cases compared to 23% of the farmers in the control group. This suggests that credit borrowers either have more financial tools to purchase necessary machineries or that they gained knowledge about the benefits of added value from coffee processing through MFI program participation.

Based on the results from the gross margin calculation it was found out that one-quarter of the credit borrowers did not have sufficient income to repay credit on time. Nevertheless, most of the MFIs took into consideration the extraordinary situation of roya disease which caused low production outputs and provided their clients with new credit on the outstanding payment. Coffee farmers therefore did not fall into a credit bureau and they could wait until the next harvest to repay the credit.

Coffee producers in the control group had an off-farm job in 63% of the cases in contrast with 30% of the farmers in the borrowers group. Off-farm activities in the context of coffee farmers are external jobs which are not related to the farming business at all and coffee farmers are basically forced by their poor economic situation to find another job. This may suggest that micro-loans permit coffee farmers to move on despite difficult economic situation compared to non-credit receivers who have no choice than search for another source of income.

6.2 Microfinance Services

It was found out that 28% of the credit borrowers were coming from the most distant village within the studied area compared to 50% of the farmers from the control group who did not live far from a bigger city. This finding can be supported by Hes (2012), who claims that MFIs serve poor people living in isolated and distant areas.

There were 55% of the farmers who obtained a loan in a group. The rest of the credit borrowers obtained loan individually. Group lending programs are commonly used in remote rural areas as compared to the individual loans they are able to cover the higher operational costs. According to Hes (2012) group lending is based on collective liability. However, the respondents' experience showed, that group lending in our case often works differently. The main purpose of creating groups is to facilitate the operational process and to decrease operational costs. However, if there is someone in the group who does not pay for their debts, they are usually sanctioned individually by default interest or excluded from the group and their names are further reported to credit bureau.

There were 30% of the farmers who obtained more than 6 loans in the past years. It may support an opinion of some authors who claim that microfinance represents bridging loans, which provide money to the poor in order to clear their earlier debts. These clients eventually get into vicious debt cycle and finally they have to face excess debt (Maina-Kiiru 2007). On the other hand, for 32% of the farmers, it was their first loan, into which they forced due to poor economic conditions caused by the Roya epidemic that affected the production.

The study also revealed that the most common payback period for microcredit in coffee production was one year. The payback periods were mostly adapted to the agricultural cycle of 1 year and credit borrowers were paying back the loan after the harvest period. This is in contrast with a study by Haji (2013) who drew attention to a low adaptability of loans payback periods to the agricultural cycle.

The most commonly obtained loan was between 2 501 – 5 000 MXN/ha. According to Hes (2012) microloans are provided in cycles, which means, that with every repaid loan borrowers can ask for bigger credit. Our study, nevertheless, revealed that microloans in cycles are provided only in MFIs of a cooperative type. The cooperative associates, first of all, need to save a certain amount of money in order to be entitled to a credit. In other types of MFIs, there is either set a quota per hectare, or the borrowers capacity of payment is verified, in some cases, there is set a maximum amount which can borrowers ask for.

The interest rate paid for microloans in our study showed to be very expensive. It was found out that 53% of the credit borrowers paid between 20.1% – 30% p.a. and 42% of borrowers paid even more than 30.1% p.a. It was confirmed that interest rates charged for microloans in Mexico are even higher than in India or Bangladesh, where the rates are usually between 12% - 15% p.a. as the market is already saturated and often subsidized by the government (Hes 2012).

Further, the data showed that 70% of the borrowers received technical support from their MFIs and 42% of the borrowers had the possibility to attend training courses on various topics. From the interviews with several MFIs, it was however found out that the attendance on these courses is always very poor, as it is run on a voluntary basis. Based on a report from Conservation Internation (CI) evaluating training and extension serviced to coffee farmers it was found out that transmission and adoption of new information were very poor (Eakin et al. 2006). It may suggest that farmers' basic education can limit the ability to use new information effectively. Providing training courses cannot, therefore, assure that farmers will immediately perform better.

Finally, it was found out that the rationale for not acquiring a credit is mainly based on fear from running into a debt, inability to pay or simply lack of desire for credit, also insufficient information and unstable production/income were among the most frequent answers. These results can be supported by Girabi et al. (2013) whose study showed that the major factors constraining the access to the credit are lack of information, high interest rates as well as the fact that some farmers do not want credit. According to

Rweymamu et al. (2003), the majority of the respondents mentioned that the factor most affecting their decision were the level of interest rate.

6.3 Impact of Microloans and Other Factors on Generated Income

The results in section 5.6 showed a positive significant impact of microloans on the income generated from coffee production. A positive impact of micro lending was also found in a number of previous studies. For instance, Barnes et al. (2001) reported a positive impact of microcredit on household income generated from crop production in Uganda. Another study by Nuhu et al. (2014) found a positive impact of microloans on maize and rice production in Ghana. Furthermore, a study by Sulemana & Adjei (2015) focused on micro lending for production of fish, maize, and rice also showed a positive impact. This pattern was also observed by Agyemang (2017) on a production of chicken and eggs and on the income generated from the agricultural production. On the contrary, Pender et al. (2004) found a small evidence of the impact of the access to credit on crop production. This may suggest that using credit by small and medium farmers is an important tool how to increase production and income but there are also other factors to complement credit in order to enhance the farm business.

In a further analysis, there was found a high ratio of gross benefits/cost of the loan which explains the fact how farmers were able to cover expenses for high-interest rates. This again supports the outcomes from the regression analysis where was found a positive impact of microloans on the farm income. Also, it was found out that the maximum profitable interest rate for in case of a loan with one-year payback period was 2.75 % p.m. From our sample, almost 70% of the farmers paid interest rate up to this limit. Nevertheless, one of the aspects which make interest rate so expensive is the risk coming from unstable natural conditions. If this risk could be diminished (e.g. insurance), the MFIs might be willing to offer credit for lower interest rate and therefore farmers could increase their income even more.

In case of this study, processing harvested coffee was found as another positive significant factor influencing the level of income. These results support those reported

by Seneshaw & Bart (2016), that adding value to coffee through processing leads to higher income and prices for coffee producers. It can be therefore assumed that investment into machineries is an important factor which can lead to increase in income.

Education was also found as a factor with a positive significant impact on the income. Similarly, Oboh et al. (2010) reported, that education positively and significantly affected the allocation of the loan in the agricultural sector. His findings are however in contrast with Nosiru (2010) who reported that education as a socio-economic factor does not determine the level of productivity in the study area. Also, Tibi et al. (2012) found that education had a significant inverse relationship with poultry productivity. As another study suggest Becker (2009) higher level of education leads to a better adoption of technologies, which can enhance productivity. In the case of coffee farmers, it can also be assumed that higher level of education may provide farmers with a competitive advantage. Moreover, higher education may also influence the right use of higher technological inputs such as fertilizers, insecticides, and herbicides or the investments in aggregating value to the coffee by processing.

Governmental subsidies in coffee production, as well as farm-income 2015, showed a positive significant impact on the farm income. Both resources are assumed to be used as a capital for another harvesting season which justifies their positive relation towards the income. Also, the impact of insecticides was found to be positive and significant.

On the contrary, an interesting data was found concerning the use of fertilizers and its negative significant impact on the farm income. This finding is in contrast with Nosiru (2010) who reported that microcredit may enable farmers to purchase inputs and increase their productivity. Nevertheless, Mexican agricultural ministry Sagarpa (2013), reported that coffee farmers in the state of Veracruz do not have sufficient knowledge about the use of fertilizers. The application of chemical fertilizers might have been used following outdated recommendations of INMECAFE. It was neither observed that the fertilizer program would be based on a technical analysis. This claim for an assumption, that coffee farmers have used inappropriate amount of fertilizers which did not contribute positively to the coffee production hence to the income. Furthermore, based on a study by Lagos-Molina (2014) it was found that greater applications of nitrogen

fertilizers to the soil was associated with greater incidence of coffee rust. This may suggest that the more fertilizers used during the disease outbreak the lower income (revenue).

Another interesting finding was observed concerning the off-farm jobs, where negative significant relation with income was found. Nosiru (2010) also reported that farmers practicing full-time farming tend to be more productive compared to those practicing part-time. The negative relation between off-farm jobs and farm-income may, therefore, suggest that farmers cannot dedicate their time fully to the farm activities what results in decreasing farm-income.

Also, the use of herbicides showed a negative impact on the farm-income. This can be supported by a report of Mexican agricultural ministry Sagarpa (2013), which found a negative impact of the frequent use of herbicides on the soil degradation and therefore creates unfavorable conditions for plants to give fruits. Another negative factor for income was family labor. This is in contrast with Nosiru (2010), who found that farmers with more household members participating in the farm activities were performing greater farm productivity. On the other hand, Kloss (2014) reported that at small and medium scale farms, hired labour is more productive than family labour and as it was seen in the section 5.4., most of the non-credit borrowers rely almost only on family labour as 73% of them do not employ any labour throughout the year.

Despite the positive impact of microloans, the phenomenon of misusing credit was confirmed in our study. In particular, 27% of the borrower's group admitted that they spent part of the credit for food, schooling, and health. This observation goes with a line with numbers received from semi-structured interviews, where it was found out that the number of default payers is usually between 3% to 30% (at Asiversa and at Financiera summate, respectively). This observation further goes in line with Girabi et al. (2013), who also reported that micro finance borrowers tend to spend the credit for food, health, education and so forth. Also, Oboh et al. (2010) reported that only 56% of microloans in Benue state, Nigeria were invested in farm activities and similarly Girabi et al. (2013) found out that only 26.5% of the borrowed money was invested in the agricultural sector. On the other hand, Stukpova (2008) claims that misusing loans does not

necessarily have to be wrong. For instance, using the loan for floor reparation can contribute in the future to higher productivity and buying shoes for children, paying tuition or improving family nutrition may also later result in higher productivity of the family member. Microloans can also provide families with money to cover their urgent needs without having to sell their assets for a disadvantageous price and therefore to endanger their future income.

7 CONCLUSION and RECOMMENDATIONS

Coffee production in Mexico was thriving under a support of INMECAFE between 1973 and 1989. Coffee farmers during that period were comfortably well-off. However, the collapse of INMECAFE in 1989 had devastating implications on the coffee farmers as they were dependent on the organization in terms of information, production, and commercialization. Coffee farmers since then on lacked technical support, advisory services and had to face exploitation from coffee brokers. Moreover, they had to deal with falling prices on the international market and coffee rust which appeared on the coffee plantations. Nowadays coffee farmers are considered as one of the poorest groups in the country.

Small and medium coffee farmers in the central part of Veracruz also suffer from exclusion from the bank services, which is usually because of lack of collateral. Thus, microloans are the only source of credits for them which are provided by several local and national MFIs. Despite the fact that the interest rate usually oscillates between 20% to 30% p.a. compared to the standard interest rate of 5.4% p.a., the return on micro loans is very high (38% p.a.). Micro loans for small and medium coffee farmers can therefore mean a step forward in order to enhance the coffee production.

Accordingly, the effects of microfinance on the economic situation of coffee farmers living in the central part of the state of Veracruz were further analyzed. The study revealed that microloans obtained by coffee farmers had a positive and significant impact on the income generated from the coffee production. Also, comparison of output levels of the borrowers and the control group showed that borrowers group was performing better in all studied years. A regression analysis further suggests that processing of coffee production, governmental subsidies, education, insecticides and farm income from the previous year had also positive and significant impact on the farm income. On the contrary, fertilizers, herbicides, off-farm job, and family workers had a negative significant impact on the farm income. Nevertheless, other factors such as paid labor (employees and seasonal worker) as well as the plants density and the interest rate were not significant in determining income generated from the coffee production.

Overall microcredit was observed to be an important factor in improving farm income even though Roya disease negatively affected the production. The impact of microloans could be even greater if the farmers made more justifiable utilization of the credit concerning the use of fertilizers and herbicides. Therefore, to maximize the effect of credit, coffee farmers need more capacitation focused on the efficient use of credit for inputs and technical support concerning the production of quality coffee and coffee processing. MFIs should, therefore, broaden the scope of agricultural extension programmes and then the 30 years cycle of old practices applied in the region could be finally broken.

Production of quality coffee as well as merchandising coffee with added value can increase farmers competitiveness and income. An extra value can be aggregated to the production either through coffee processing or by producing specialty coffee. Specialty coffee has recently gained a huge popularity on the international markets. It is a way of producing coffee under strict quality control which provides final consumer with information about the whole process of the production (origin, variety, humidity to be exposed, cultivation, harvest, etc.) (AMCCE 2017). Veracruz offers diverse agro-climatic conditions under which coffee farmers could obtain a unique production and a competitive advantage on the market.

Based on the findings the participation on the capacity buildings run by MFIs is very low. Therefore, it is recommended to introduce a new format based on an obligatory basis which would place focus on delivering information such as the importance of creating one-variety plantations, collection of ripe coffee as well as the change in the culture of using fertilizers and rather to pay more attention to the soil management (Sagarpa 2013).

Furthermore, MFIs should not provide credit for one year with interest rate higher than 2.72% p.m or 3.25% p.m. (effective, accumulated, respectively) as higher rates will lead to negative return on income of farmers who are subsequently not able to repay their credits which result in farmers being on a credit bureau and MFIs having outstanding debt.

To combat roya disease, the Mexican government started to distribute to the coffee farmers disease resistant plants. Nevertheless, based on the findings the distribution is not equally done, as not all of the interviewed farmer actually obtained them. The roya appeared in the coffee production already several times in the last 4 decades. Therefore, it would be recommended to diversify coffee production in order to decrease the risk of the reappearance of this disease. Furthermore, it is recommended to extend home gardens which nowadays usually contain only a small number of fruit trees and which are therefore unable to provide food security for the families in case of emergency situations.

There are several efforts going on from the side of the private sector, NGOs, coffee firms etc. (among them also MFIs) to provide technical assistance to the farmers to enhance their production (Rodriguez-Padron & Burger 2016). Nevertheless, the role of public extension services is fundamental to change the obsolete system of poor agricultural practices in Mexico. For that reason, also public institutions should provide incentives for the farmers in order to encourage them to produce quality coffee by assuring, that the quality will be recognized at all levels of the supply chain. For that purpose, there should be established nationally recognized quality standards, so that the dedication of the farmers carried out in their work can be equally recognized.

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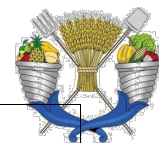
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Appendix 1: Structured questionnaire for coffee farmers

UNIVERSIDAD AUTÓNOMA CHAPINGO
DIVISION DE CIENCIAS ECONOMICO ADMINISTRATIVAS



MUNICIPIO

Lugar de entrevista

Número de personas presentes durante la entrevista

INFORMACIÓN GENERAL

señor señora

¿Qué edad tiene usted? (años)

¿Actualmente usted es?

soltero/a casado/a divorciad/a separad/a viudo/a otro

¿Cuántos hijos tiene?.....

¿Cuál es su máximo nivel de estudios concluidos?

- Ninguno
 Educación primaria
 Educación secundaria
 Educación media superior (bachillerato, preparatoria)
 Superior
 Posgrado

INFORMACIÓN SOBRE PRÉSTAMOS

¿Cuál es el nombre de la Institución micro financiera (IMF) que le presta dinero?
.....

¿Cuánto tiempo tiene de participar en IMF? (años) (meses)

¿Cuántos créditos ya ha obtenido? (número)

¿Qué fecha obtuvo el ultimo crédito? (mes) (año)

¿Cuál es la fecha establecida para pagar este crédito? (mes)(año)

SI YA HA PAGADO:

- Pagó al tiempo
 Pagó, pero fuera del tiempo

Préstamo de su IMF obtuvo:

de manera individual en grupo

¿Cuál es el monto TOTAL del préstamo que tiene con su IMF? (\$)

monto en 2016 (\$)

monto en 2015 (\$)

monto en 2014 (\$)

¿Cuál es la tasa de interés que paga a su IMF? (%)

tasa sobre saldos tasa fija

¿Con que recursos paga los préstamos de su IMF?

- con sus ahorros (señale los más importantes)
- con lo que gana de su negocio
- con lo que gana de su otro negocio (especifique).....
- remesas
- con su salario (tengo trabajo asalariado)
- con lo que le da su marido / otro familiar
- con otro préstamo
- otro (especifique)

¿Utiliza el préstamo únicamente para mejorar su producción agrícola?

- sí no
- SI LA RESPUESTA ES NO:
¿Para que actividades usa el préstamo? (señale los más importantes)
- alimentos
- ropa para la familia
- guardo dinero para emergencias
- festividad o celebración familiar o religiosa
- pago de gastos escolares
- gastos de salud
- mejora de la vivienda
- ahorro
- otro (especifique)

¿Realiza algunas otras actividades (tiene otro trabajo) desde cuando recibió el préstamo?

- sí no
- SI LA RESPUESTA ES SI:
Especifique que actividades está realizando.
.....
.....

¿Debe hacer reportes a su IMF en qué gastó su préstamo?

- sí no

¿Que servicios adicionales le ofrece su IMF?

- capitalización
- asistencia técnica
- apoyo para comercialización
- precio de concertación
- otro, especifique

¿Recibe aparte del microcrédito de su IMF otro tipo de apoyo de otra organización?

- sí no
- (Sagarpa, Programa 65+, Pension, otra Microfinanciera u otra organizacion....)
- SI LA RESPUESTA ES SI:
¿De que institución lo recibe?
- ¿Qué tipo de apoyo adicional recibe?

- apoyo financiero, especifique el monto.....
- otro préstamo, especifique el monto
- capacitación (especifique)
- otro, especifique el monto

¿Creé que mejoró su acceso a créditos bancarios después de obtener el préstamo de su MFI?

- sí no

INFORAMCIÓN SOBRE LA PRODUCCIÓN

¿Cuál es el cultivo principal que produce?

¿Desde hace cuando produce este cultivo?(años)

¿De que tamaño es su terreno destinado a la producción?(ha)

DE ESTE:

Terreno de su propiedad son.....(ha)

Terreno alquilado son(ha)

Otro tipo de posesión (especifique) (ha)

¿Quién trabaja en su negocio?

(señale a todos los que trabajan)

- yo
- mi esposo
- mi/s hijo/s, especifique el numero
- otro/s familiar/es, especifique el numero
- otros, especifique el numero

Mencione todos sus insumos de producción, su cantidad y sus precios.

- terreno(\$/ha)
 - plantas(número/ha)(\$/planta)
 - plantas regaladas por su MFI(número)
 - fertilizante (bultos/ha)(\$/bulto)
 - jornales totales(\$/jornal/día)
 - empleados de temporada(\$/jornal/día) / (\$/kg)
- gastos de dinero por productos para combates de malezas y plagas
- herbicidas (\$/ha)
 - insecticidas (\$/ha)
 - despulpadora (\$)
 - tostador (\$)
 - molino..... (\$)

¿Vende su producto en cerezas o procesado?

- cerezas pergamino molido

En porcentaje que parte de su producción vende en:

- Cerezas(%)
- Pergamino(%)
- Molido(%)

Por favor rellene esta tabla (incluso las unidades):

	2013	2014	2015	2016
Producción generada (quintales/ ha)				
Precio de venta - cerezas (\$/kg)				
Precio de venta - pergamino (\$/quintal)				
Precio de venta por café molido (\$/kg)				

Desde que tiene el microcrédito su producción:

- ha mejorado, qué cambios ocurrieron? (señale todos los que ocurrieron)
 - mejoró la calidad de los productos
 - aumentó la producción
 - vende su cultivo ya procesado
 - vende su cultivo ya empaquetado
 - vende su cultivo con su marca propia
 - mejoró la presentación de los productos
 - amplió su red comercial
 - contrata más trabajadores
 - subió el precio de venta
 - ha reducido costos gracias a nuevas maquinarias
 - mejoró el lugar donde produce
 - ha comprado herramientas pequeñas
 - se facilitó la venta
 - otro (especifique).....
 - ninguno de los anteriores

está igual

ha empeorado, por qué empeoró?.....

¿Podría seguir sin el crédito de su MFI con su negocio?

- sí, podría seguir no, no podría seguir

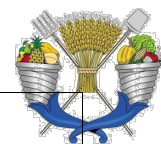
SI LA RESPUESTA ES NO:

Que problemas tendría si ya no cuenta con el crédito?

.....

Appendix 2: Semi-structured questionnaire for MFIs

UNIVERSIDAD AUTÓNOMA CHAPINGO
DIVISION DE CIENCIAS ECONOMICO ADMINISTRATIVAS



1. ¿Cómo se llama?
2. ¿Cuándo se creó?
3. ¿Cuántos clientes tiene?
4. ¿Cuáles son las **condiciones del préstamo**?
 - a. ¿Que requisitos les piden a las personas para darles crédito?
 - b. ¿Ofrecen créditos en una manera individual o únicamente a grupos?
 - c. ¿Cuál es el plazo para pagar el préstamo?
 - d. Los préstamos se conceden en ciclos...¿Cómo determinan los ciclos?
 - e. ¿Cómo se determina el monto de préstamo?
 - i. ¿Como determinan cuando y cuanto puede aumentar el crédito?
 - f. ¿Hay reuniones regulares y obligatorios para los grupos de préstamo?
 - i. ¿Cual es el objetivo y contenido de estas reuniones?
 - ii. ¿Tienen que pagar multas por llegar tarde a las reuniones?
 - g. ¿Hay un supervisor que vigila a los clientes?
5. ¿Cuál es la **tasa de interés**?
 - a. ¿La tasa es la misma siempre o se cambia cada año?
6. ¿Cuáles son las **condiciones para pagos**/recuperación del dinero?
 - a. ¿Cómo se determina el momento de pago?
 - b. ¿Hay sistema de control?
 - c. ¿Qué pasa a los clientes si no pagan el crédito? ¿Los sancionan?
 - i. ¿Como sancionan a clientes /grupos de crédito que no pagan?
 - d. ¿Con que frecuencia ocurre que alguien no paga? (%)
 - e. ¿Cuáles problemas presentan para no poder pagar?
 - i. ¿Utilizan los clientes el préstamo únicamente para mejorar su producción agrícola?
 sí no

SI LA RESPUESTA ES NO:

¿Para que actividades usa el préstamo?

 - alimentos
 - ropa para la familia
 - mantengo dinero para emergencias
 - festividad o celebración familiar o religiosa
 - pago de gastos escolares
 - gastos de salud

mejora de la vivienda

ahorro

otros, cuáles???

(Como reconocen que las cosas compraron del crédito o de lo que ganaron)

f. ¿Cuales problemas les ocurren si no pagan?

7. ¿Cuántas **personas solicitaron** el microcrédito en el año 2016 y cuantas lo **obtuvieron**?

a. ¿Por qué no las apoyaron y las rechazaron?

8. **Montos de créditos** de los clientes/cooperativas en últimos 3 años.

9. ¿Que **apoyos adicionales** ofrecen a los clientes?

(fundamentos de contabilidad, capacitación en marketing, en negocio, otros....)