The value of credit to smallholder farmers in the Belas community in Manicaland Province of Mozambique

by

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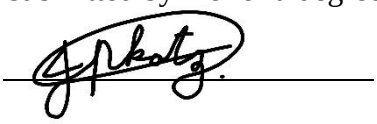
DECLARATION

I, **Juan-Pierre Kotzé** declare that the dissertation, which I hereby submit for the degree MSc (Agric) Agricultural Economics at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

SIGNATURE: 

DATE: 18 December 2020

DEDICATION

I Dedicate this thesis to my family, especially my mother and father, who taught me that the ability to work hard is a blessing and who always carry their children’s best interests at heart.

ACKNOWLEDGEMENTS

First and foremost, I would like to thank the Almighty God for giving me the opportunity and ability to complete this dissertation. Luke 1 verse 37 reads, “For with God nothing will be impossible.”

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LIST OF ACRONYMS AND ABBREVIATIONS

AECF	African Enterprise Challenge Fund
AFAP	African Fertilizer and Agribusiness Partnership
AfDB	African Development Bank
AGRA	Alliance for Green Revolution in Africa
BCI	Banco Comercial e Investimentos
CBFI	Community based financial institutions
CLUSA	Cooperative League of the USA
DCA	Development Credit Authority
DUAT	Land use right
EU	European Union
FCID	Catalytic Fund for Innovation and Demonstration
FNB	First National Bank
FPC	Central Bank's reference rate
IFAD	International Fund for Agricultural Development
IFI	Index of financial inclusion
KFW	Kreditanstalt für Wiederaufbau (German development bank)
MBS	MyBucks Banking Corporation
MFI	Micro-financial Institution
MG	Matching Grant
MNO	Mobile Network Operator
MSE	Micro and small enterprises[1]
MSME	Micro, small and medium enterprises[1]
MZN	Mozambique National Currency – metical
NGO	Non-governmental organisation
NUIT	Tax identification number
PROIRRI	Sustainable Irrigation Project
REFP	Rural Enterprise Finance Programme
SIDA	Swedish International Development Agency
SME	Small and medium enterprises[1]

[1] Micro, small, and medium enterprises are mainly differentiated due to the number of employees and capital within the enterprise. Where small enterprises have more employees and capital than micro enterprises and medium enterprises more than small enterprises. MSE excludes medium enterprises and SMEs exclude micro enterprises while MSMEs include all the above-mentioned enterprises.

TA	Technical assistance
USAID	United States Agency for International Development

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ABSTRACT

Smallholder farmers across the world, including Mozambique, are often faced with limited growth potential. This could mainly be attributed to an inability to purchase sufficient inputs to produce more and better-quality crops and to cultivate more land. This, in turn, is directly related to the fact that many of them do not qualify for credit, or put in another way, they are financially excluded. Smallholder farmers are known to have little or no assets to offer as collateral against loans. However, the question to be asked is, does this matter? This study proves that credit does make a difference in the community of Belas, Manica Province, Mozambique, despite the perceived high costs thereof. If given access to credit, these smallholder farmers will continuously make use of this opportunity, which in turn will lead to an increase in the procurement of inputs. Data obtained from a group of 142 smallholder farmers in the Belas community in Mozambique, and stored in a cloud-based data system, was used to analyse and graphically depict the uptake of loans, repayment records and the increase in the procurement of inputs.

The number of new loans taken over time is used as a measurement of the initial demand for loans, while the repayment rate acts as the repayment ability of the farmers, further the continuous uptake of consecutive loans is used to further measure whether the farmers find value in taking up loans. The repayment rate and uptake are also measured in respect of gender, age and financial inclusion to establish whether these factors cause any deviations from the mean.

The data made it evident that, once loans are made available to these farmers, they do make use of the opportunity, and once they repay their first loan, they are likely to take up a new, larger loan to further increase the procurement of inputs, and at a later stage, also increase the use of equipment like tractors. The sample group of farmers was initially slow at repaying their first loans, but the repayment rate of the farmers increased once they moved to their second and third consecutive loans. This could be attributed to the continuous training they received once they started to qualify for loans.

The uptake of credit was also affected by the age of farmers, where farmers between the ages of 41 and 50 were more likely to take up loans and furthermore to repay their loans and take up consecutive loans. With respect to the repayment ability of a farmer, it was found that a longer-term relationship between the financier and the farmer resulted in a better repayment ability by the latter. Women were found to repay their loans marginally faster than men did.

In conclusion, this study found that farmers do see the value of credit, despite the perceived high costs, and that the uptake of loans leads to an increase in the procurement of inputs.

It is recommended that microcredit be accompanied by training, to ensure the effective production of their products and therefore the repayment of their credit. MFIs need to operate in a competitive environment to ensure that no one company can inflate the costs of lending, this means that policies need to accommodate easy access to this market.

Key words: Microfinance; microcredit; financial inclusion; mobile wallet; smallholder farmers; repayment of credit; Mozambique; Manica; Belas.

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CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

Africa is a continent based on agriculture, with approximately 60 percent of the region's labour force being involved in agriculture (African Development Bank, 2017). While this number reaches 80 percent in Mozambique, agriculture only contributes 25 percent of the Mozambican GDP (CGAP, 2017). While a 25 percent contribution to the GDP would be considered high by any global standard, relative to the percentage of labour employed in the sector, this is low. It can be attributed to a lack of access to working and other capital in the form of credit. This has further negative consequences, such as a lack in technology adoption, quality inputs, and low fertiliser usage (Salami et al., 2010). In Mozambique, for example, an estimated 3.4 million smallholder farmers contribute 97 percent of the country's agricultural production (CGAP, 2017 & 2016). The average size of such a farmer's agricultural land is 1.2 hectares, while there is minimal utilisation of fertiliser, pesticides, and mechanisation (CGAP, 2016). Ultimately, the productivity of this land remains extremely limited – much of this can be attributed to the lack of financial inclusion faced by such farmers. The World Bank defines financial inclusion to mean that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit, and insurance, delivered in a responsible and sustainable way (2018). However, at the same time, Osafo-Kwaako et al. (2018) state that two billion individuals and 200 million small businesses in emerging economies today lack access to formal savings and credit.

According to the IFC (2014), only 4.7 percent of adults in the developing world's rural community have access to a loan from the formal sector. The fact that the majority of the African population remains "unbanked" ultimately means that the population forgoes opportunities to accumulate savings and interest, while banking institutions lose the opportunity to utilise these saved funds to finance surrounding communities. In a wider context, meaning other than the formal sector, the role of CBFIs (community based financial institutions) should not be overlooked. Research conducted by Rural Finance Knowledge Management Partnership (2014) in Mozambique found that CBFIs, such as village savings and loan associations, are better placed to offer basic financial services in the remote rural areas that other financial service providers, including MFIs, struggle to reach effectively. In a

Kenyan study on the financial inclusion of smallholder farmers, Okech et al. (2017) revealed that geographical dispersion, amongst other things, is the main reason why such a large proportion of the population remains unbanked. Particularly in rural areas, geographical dispersion increases the transaction costs of becoming part of the formal financial system. This is the typical scenario faced by commercial banks in Mozambique, which find it challenging to serve much of the rural population. Hunguana et al. (2012) indicated that, at that time, Mozambique had 462 commercial bank branches, of which only 24 percent were directed at servicing rural areas of the country.

This study is conducted by making use of data collected from 142 smallholder farmers who form part of a microfinance project, managed by Gestao de Cereais in the Belas community of Mozambique.

The Belas agricultural community, located in Manica Province to the northeast of Vanduzi town, as indicated in the picture below (Figure 1-1), is considered to be a progressive smallholder farming community.

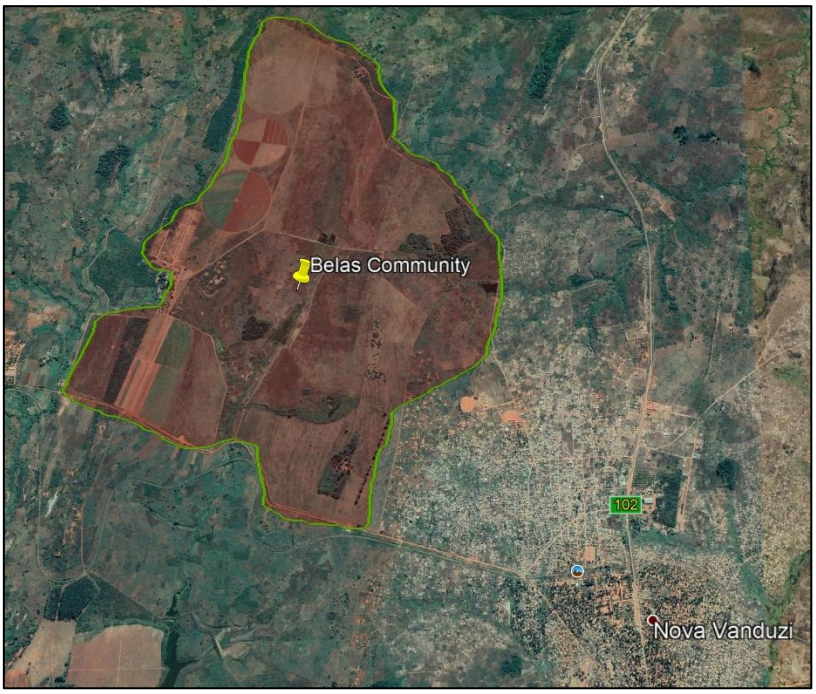

Figure 1-1: Map showing the area of the agricultural community of Belas.
Source: Google Earth Pro (2019)

Climatic conditions allow for year-round production, and the construction of an irrigation scheme several years ago provides near unlimited water, year-round. However, despite this advantage, farmers experience restricted production resources, most notably credit (or cash) to buy inputs.

Against the limitation of available credit, and despite land being the next scarce resource, most farmers cannot purchase enough inputs to plant all their existing lands, or to even efficiently cultivate the lands that have been planted. It is therefore important to understand the value[2] of available credit to this farming community, and many other similar communities. There has recently been a strong demand (uptake) for available credit, which has resulted in an increase in the procurement of farming inputs. This is evident in the recurrent uptake by most farmers and in how leader farmers excel at utilising this opportunity. The photo (Figure 1-2) below depicts the mountains, where the irrigation water originates, and the irrigation lands below.

Figure 1-2: Belas irrigation field.
Source: Own data

Production costs are relatively low, since original community lands were acquired for no charge, and even if purchased or rented today, the cost is relatively low. Water is gravity fed and only by exception is a fuel-driven water pump used. Mostly, family labour is used. Many times, vendors who purchase the finished product would come and harvest the product themselves, bringing their own labour (depending on the product). By far the most significant costs for the smallholder farmers are those for seeds, fertiliser, and chemicals. Most farmers, irrespective whether they are large- or small-scale farmers, do not have sufficient cash to plant all their lands and/or to efficiently cultivate them.

[2] The Cambridge dictionary defines value as the worth of something to someone, or how useful or important something is to someone (Cambridge dictionary 2021, curriculum entry), in the same way the value of credit in this research refers to how useful/important credit is or will be to farmers once they gain access to the facility. This value can be measured in the increase in input utilisation or increased consumption.

1.2 PROBLEM STATEMENT

Rokhim et al. (2016) evaluated whether microcredit improves the wellbeing of the people who gain access to this facility, they found that credit had an overall positive relationship was found for these people. Banerjee et al. (2009) had similar findings, that stated that profits increased once microcredit was made available to business owners.

By far the majority of smallholder farmers of the community of Belas cannot escape their poverty trap without credit. They need credit to procure the farming inputs that would enable them to cultivate their existing lands more effectively and/or to plant more lands. Only through increased production and/or improved product quality will they be able to improve their livelihoods.

This study aims to evaluate the value of credit and whether the availability of credit specifically to smallholder farmers will increase their use of inputs and therefore increase their farming operation.

1.3 RESEARCH OBJECTIVE

The primary objective of this research study is to determine whether there is a demand for credit amongst Belas smallholder farmers if available, also referred to as the research gap. Recognising that their crops will potentially yield more and be of a better quality when utilising credit. This is despite the perceived high cost of obtaining credit. In combination to this the research aims to prove an increased uptake of credit also leads to an increase in the procurement of inputs and, ultimately, an improvement in the livelihoods of the farmers of Belas.

The secondary objectives of the research are to:

i. Determine whether the level of financial inclusion differ for different age groups and genders.

ii. Asses the importance of a database and the ability to build a profile and credit score for a farmer.

iii. Identify the factors that affect the uptake of microcredit, when available.

iv. Identify the factors that affect the repayment of microcredit.

1.4 HYPOTHESIS

The research will first seek to prove that there is a strong demand and uptake for available credit to enhance production.

> *H_0: The availability of credit, the uptake thereof and the purchase of production inputs are positively correlated.*

Furthermore, research conducted will continue to illustrate that uptake remains strong, despite the perceived high cost attached to this.

> *H_0: The perceived high cost of credit is incorrect when compared against the strong demand and uptake of available credit.*

1.5 METHODOLOGY

The study has been conducted in conjunction with a Mozambican partner, Gestao de Cereais, Lda. The research partner collected the data and stored the data on a database for easy access, extraction, and analysis.

At the request of the partner, my role was to interpret and analyse the primary data and make meaningful interpretations. By implication, the partner has granted me electronic access to the data and permission to publish the results. The first step was to compile a database profile of each farmer that includes data such as location (village & district), identification cards, mobile numbers, mobile wallet, and bank information. This data will be analysed with the first objective being to determine the level of financial inclusion of farmers in the Belas community.

In the farming community of Belas, the first endeavoured, as mentioned in section 1.3 'Research objectives' is to determine the degree of financial inclusion by making use of the data collected by Gestao de Cereais. This is followed by determining the correlation between financial inclusion and performance (payback of their loans) by the farmers. To what extent do successful farmers today all have mobile wallet[3]? Additional data has also been collected by the research partner in respect of the loans obtained and the usage of these loans. For this

[3] Mobile wallet refers to a payment service offered by mobile networks that act as an alternative to owning a bank card.

purpose, an Oracle database software programme with an Apex frontend has been developed to capture and analyse the data.

The second objective is to determine whether there have been increases in loans taken up, the size of the loans, and the interest and fee structure payable by the borrower. What percentage of farmers, after having repaid their loan, applies for another loan, and do they ideally wish to increase their loan size? Another important objective is to determine the degree to which farmers are servicing their debt and how timely. The usage of loans is the last critical factor that will be analysed. An analysis has been conducted to determine the application of the loans. The key production input categories to be analysed are fertilisers, seeds, chemicals, manure, labour and mechanical work. Once analysed, the results were aggregated and gave an accurate assessment of the demand for credit, if available, and of the usage and the benefits thereof.

R is used to run a multiple regression analyses to enable the evaluation of the significance of the various factors and the impact it has on the repayment rate of the loans, these factors are;

- age,
- length of relationship and
- size of the loan.

1.6 DELINEATION AND LIMITATIONS

The results of the research are limited to the irrigation area of the Belas community. However, it is acknowledged that the demand for credit and perceived costs may differ from one community to another.

Despite an increase in the procurement of inputs, the data collected to date is insufficient for determining whether there has been an increase in production or income.

1.7 UNDERLYING ASSUMPTIONS

The majority of smallholder farmers of the Belas community strive to improve their livelihoods. They will make a very basic calculation, and if in their view the additional purchase of inputs will improve the production outlook of their crop, and ultimately their income, they will take up the credit.

1.8 ACADEMIC VALUE AND CONTRIBUTION

This research study will strive to prove that there is a demand for the uptake of credit among smallholder farmers, despite its perceived high cost, and secondly, that this leads to an increase in the procurement of inputs and an enhancement of production. If correct, a renewed and continuous effort should be made to make credit available and to teach farmers how to use it responsibly. If correct in these assumptions, this study will open up additional research opportunities related to sales turnover, profit margins, repayment of loans, credit scoring, and the like.

1.9 OVERVIEW OF CHAPTERS

CHAPTER 2 will present a literature review. Vast amounts of research have been done on the availability and value of credit to smallholder farmers. Despite this, credit is still lacking in certain communities. Apart from highlighting the value by quoting past research results, an additional focus will be placed on the issue of why credit is lacking in the Belas community. CHAPTER 3 will assess the credit available for smallholder farmers in Mozambique. CHAPTER 4 will present an overview of the Belas community, specifically in the context of the objectives of the World Bank irrigation project, past availability of credit, and as to why it has failed. An overall profile of the farmers will be presented and evaluated in this chapter. CHAPTERS 2 to 4 will focus on desktop research, supplemented by some practical data collected in the Belas area. CHAPTER 5 will deal with record keeping and the importance of developing a database. The latter was the single reason why the research data could be obtained and analysed in this study. In CHAPTER 6, the research results are presented, focusing on four key areas, namely availability of credit and uptake, continued demand for follow-up loans, higher nominal values of subsequent loans, and increased procurement of inputs. In CHAPTER 7, the repayment of the loans and the perceived high costs of credit are evaluated. CHAPTER 8 presents the conclusion and recommendations.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents the literature that is relevant to the topic at hand and is used as guidance on the methods used to evaluate the factors that are deemed important when evaluating microfinance and the effect it has on the borrowers.

The first part of this chapter is focused on the financial inclusion in sub-Saharan Africa and specifically in the Manica province of Mozambique. The effect of technological advances on the financial inclusion is also discussed. The chapter then discusses the uptake, repayment, costs and use of microcredit and the various factors that literature has identified as being significant variables to estimate the behaviour of the borrower/MFI in respect of the uptake, repayment, cost, and use.

2.2 FINANCIAL INCLUSION IN THE SUB-SAHARAN AFRICA (SSA) REGION

Financial inclusion is defined as having access to sustainable and safe, formal financial products by all members of the economy to satisfy their needs. This includes money transfers, credit, savings, and insurance (Sarma and Pais, 2010).

Sarma and Pais (2010) state that financial inclusion can be measured by making use of the index of financial inclusion (IFI), which represents a number between 0 and 1, where 0 refers to total financial exclusion and 1 denotes complete financial inclusion.

The low levels of financial inclusion in the region are described by Fanta et al. (2016) as “the inability of ‘brick and mortar’ banks to provide financial services to rural, smallholder farmers at affordable rates”.

Asuming et al. (2018) state that the determinants that effect the level of financial inclusion in the SSA region are gender, age, education, and the relative wealth of an individual. Their findings show that women are less likely to be financially included when compared with men because women are not as active in the formal job market where it is necessary to have an account. Individuals are also more likely to have an account registered in their name as their age, education level and wealth increases (Asuming, Osei-Agyei and Mohammed, 2018).

The levels of income of many poor families around the world are highly irregular and can vary greatly over both the very short and the long term, as these families are unable to absorb

random shocks, such as a poor yielding crop or sickness and death within the family. While such families are characterised by low levels of income, it is the variability of this income that limits their ability to absorb any shocks, which may have a profound impact on their ability to meet their day-to-day living expenses, and by extension, their ability to save (Ehrbeck et al. 2012). Ehrbeck et al. (2012) further state that this leads to the utilisation of informal financial services or CBFIs, which come at a higher price, in most cases. CBFIs should, however, be put in context: interest income is often distributed among members, which effectively reduces their high loan costs, and members often qualify for a loan that would not be available in the formal sector.

Financial inclusion can be directly linked to economic growth. Inoue and Hamori, 2016 explain that increasing the accessibility of financial services would in turn lead to households and companies (who do not have access to these services) increasing their economic activity.

The World Bank (2018) states in its recent data sheet on financial inclusion in Mozambique that digital finance is emerging with a rapid growth of mobile money accounts, which is helping to improve access to financial services, although it remains confined to urban areas. There were more individuals with mobile money accounts (370 accounts per 1,000 adults) than with a bank account (332 accounts per 1,000 adults). However, ownership of accounts does not necessarily translate into use: according the Findex 2017 survey by Demirgüç-Kunt et al., 2020, only 22 percent of adults use a mobile phone or the Internet to access an account.

2.3 FINANCIAL INCLUSION IN MANICA PROVINCE

Agricultural production primarily takes place on land ranging between 1.35 and 1.7 hectares, which limits the ability of these rural smallholder farmers to take advantage of economies of scale (Silici, et al., 2015, Borzaga et al., 2016). The inability of these smallholder farmers to expand their operations is linked to (Borzaga et al., 2016, BAGC, 2010):

(1) A lack of credit – formal financial services are rare in these rural areas.

(2) Credit, when available, is extremely costly, at 20 – 45 percent per annum. (Authors' note: since 2015, lending rates have increased to approximately 42 – 60 percent per annum, but have decreased again.)

(3) Poor agricultural and general infrastructure, poor road conditions, etc.

(4) A lack of agricultural knowledge of farmers.

A survey conducted by UT Grain Management on behalf of Fintrac (2018) found that only 4 percent of the 727-sample population indicated that they had their own bank accounts (Figure 2-1).

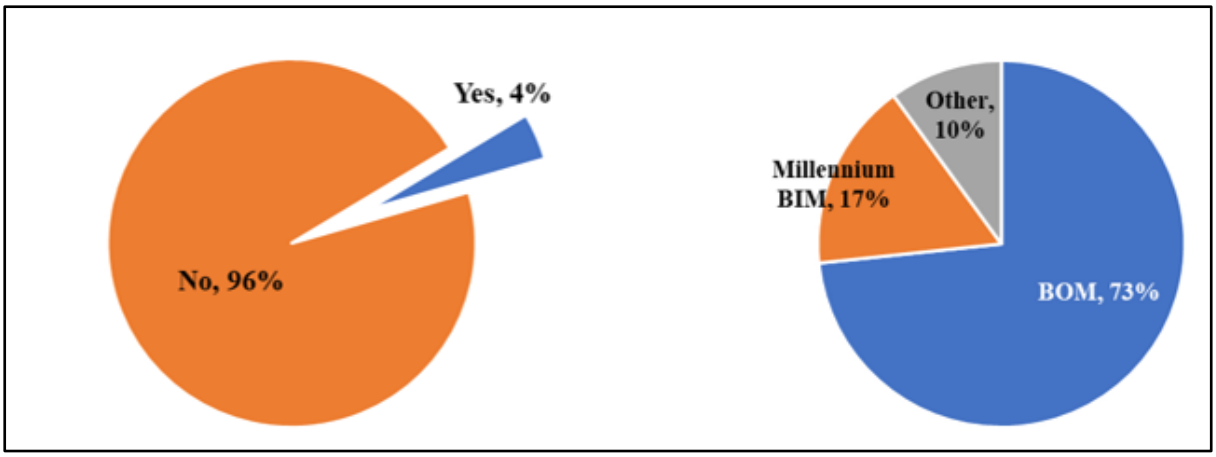

Figure 2-1: Bank account distribution of smallholder farmers in Manica Province
Source: UT Grain Management, 2018

This is consistent with a study by Hunguana et al. (2012), which reported that only 3.7 percent of rural farmers in Mozambique have access to formal credit, although that study was based on all farms, regardless of size. More recent data by CGAP released from their Smallholder Families Data Hub 2015 national survey estimated financial inclusion at 7.4 percent. In the Fintrac/UT Grain Management project survey, results showed that respondents had a clear preference for Opportunity Bank Mozambique (BOM) in the province, with 73 percent of the 30 farmers who indicated that they have their own bank accounts saying that their accounts were held with BOM. This is understandable since BOM had, over the past seven years, actively targeted smallholder farmers in opening accounts and providing production loans. Moreover, BOM can serve its most remote clients through its mobile bank vehicle. The vehicle is converted into a mobile branch, driving from village to village, servicing rural clients. The next biggest market share belongs to Banco Internacional de Mozambique (known as Millennium BIM), with a 17 percent share in the market.

Further down, in Section 4.3.6 ‘Bank accounts & closest banks and ATM’ and Section 4.3.7 ‘Mobile networks and mobile wallets’, the profile of the farmers participating in the Fintrac/UT Grain Management project is discussed as it relates to these two topics.

In the same project, farmer respondents were also surveyed on whether they owned one mobile phone or more than one mobile phone (a prerequisite for a particular rural farmer to take part in the survey was that the farmer must either own or have access to at least one

mobile phone). The answer to the question is important as it is assumed that the probability of a rural farmer being willing and able to adopt mobile financial services increases if the farmer has more than one mobile phone. The reason is, as also explained elsewhere in this research report, that the dominant MNO, Movitel/eMola, which is accessible to most farmers, differs from the leading mobile money service provider, Vodacom/M-Pesa, and therefore two SIM cards or two phones are often required by farmers. From the results, only 46 farmers indicated that they own more than one mobile phone, representing 6.3 percent of the population (Figure 2-2). (Authors' note: it has subsequently been established that dual SIM phones, at affordable prices, are rapidly entering the market and will not only change the above scenario but bring significant benefits to the roll-out of mobile money services.)

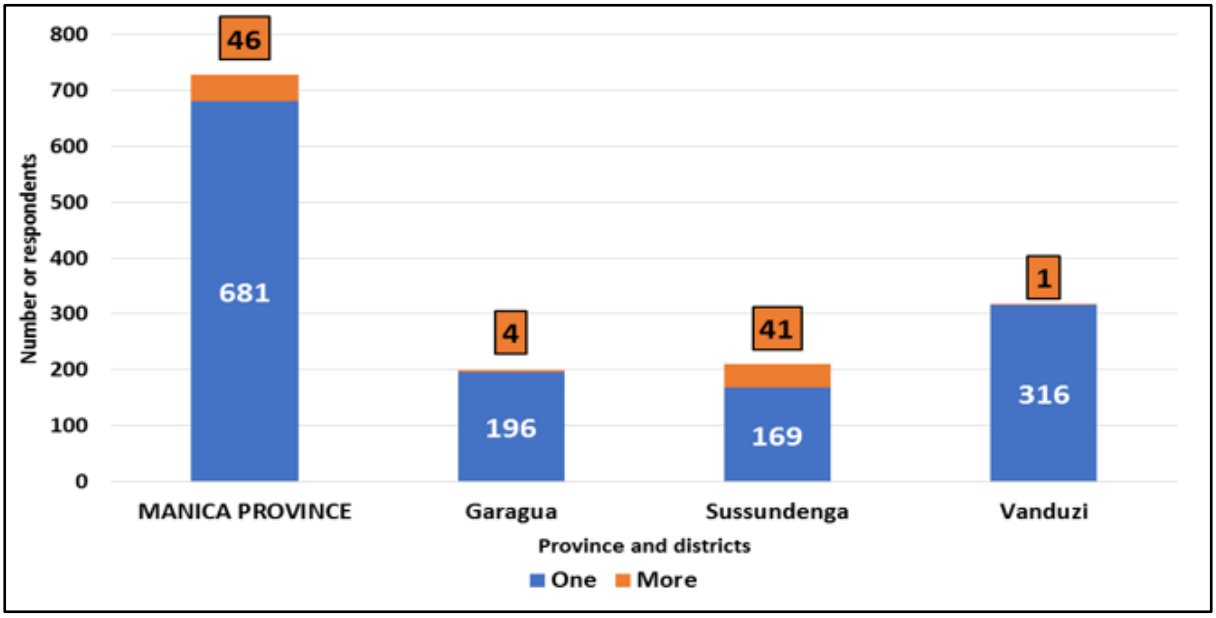

Figure 2-2: Mobile phone ownership amongst smallholder farmers, per district and cumulatively for Manica Province

Source: UT Grain Management (2018)

When it comes to mobile wallet uses, another interesting observation from the UT Grain Management survey results came from a question where respondents were required to rank their most preferred transaction type from 1 to 6, with 1 being the most preferred type of M-Pesa transaction. The results for Manica are depicted in Table 2-1 below.

Table 2-1: Most preferred M-Pesa transactions by smallholder farmers

Transaction type	Rank
Purchasing airtime	1
Transferring money (person-to-person)	2
Purchasing food and drinks at a local shop	3

Paying electricity (utility) bills	4
Purchasing farming inputs at a local shop or agro-dealer	5
Purchasing household consumables at a local shop	6

Source: UT Grain Management (2018)

The transaction type, 'Transferring money', has relevance for the *Gestao de Cereais* project since farmers are encouraged to repay loans by mobile wallet (see CHAPTER 7).

UT Grain Management summarises their project results as follows: "*Only 4 percent of smallholder farmers have bank accounts and therefore have access to financial services, including loans. This is a clear indication that there is a need for an alternative solution to bring about financial inclusion for smallholder farmers. Mobile money services appear to offer such a mechanism. The survey results indicate that already the first generation of farmers who have a mobile phone have started to acquire a second phone, since 6 percent already own more than one mobile phone. Farmers are mostly dependent on Movitel in terms of MNO network coverage, which contrasts with M-Pesa, which is by far the superior mobile wallet and is associated with Vodacom, which is mostly limited to the larger rural towns. The study established that a well-structured training campaign should be introduced. This should not be limited to theory but should specifically include practical workshops, mobile wallet registration of each user, and real-life transactions. Despite this, farmers who had been exposed to mobile money services and received training had already embraced this technology."*

The comment regarding the training – although limited to mobile wallets – has particular relevance for the *Gestao de Cereais* project since it originates from offering training in a practical environment to farmers, combined with the potential of access to loans being available.

2.4 MICROCREDIT

2.4.1 Overview

The terms 'microfinance' and 'microcredit' are often used interchangeably, causing misunderstanding when interpreting microcredit. The term 'microcredit' was not used until the seventies and refers to small-scale loans that are made available, usually to MSMEs (micro, small and medium enterprises) (Qudrat-I Elahi and Lutfor Rahman, 2006). The availability of secure and sustainable microcredit forms part of microfinance, which refers to

a broad range of different financial services that are made available to individuals/businesses that was previously excluded from such services. These financial services include, but are not limited to, credit, savings, and insurance.

Literature is inconclusive in evaluating whether microcredit leads to growths in the community. Ashraf et al. (2009) state that microfinance has a positive impact on overall household income. Nanor (2008) found that microcredit has a positive relationship to expenditure allocated to children's education and food expenditure, further stating that these expenditures are associated with an improvement in the quality of life for low-income households. A study by Banerjee et al. (2009) found no significant effect of microfinance on the expenditure on consumables, but rather a positive effect on the per capita expenditure of durable goods, especially for already established businesses. The increase in durable goods increased the profitability of these MSMEs.

In a contrary view to this, Bateman (2010) states that microcredit shows no increase in household income, but rather causes these households to fall into a debt trap due to the high costs associated with these loans.

2.4.2 Uptake of microcredit

Rokhim, Sikatan, Lubis and Setyawan (2016) reviewed the factors that affect the demand for credit and found the most important factors to be divided into three main categories, namely individual factors, household factors and cost factors.

Individual factors identified by Rokhim et al. (2016) are gender, age, marital status, and education level. Modigliani in 1966 had stated the relationship between age and credit uptake to be inversely related and explained that younger individuals are more likely to earn higher incomes and be more prone to take part in various financial activities. Women are less likely to take up loans due to the perceptions people have, especially in these rural areas, that women should not pursue an entrepreneurial role. Women often need permission from their spouses to take up a loan.

Findings by Tang et al. (2010) showed that the demand for credit has a positive relationship with education level, stating that one extra year of education increases the probability of taking up credit by 2.5 percent.

Household factors identified by Rokhim et al. (2016) are income level, asset size and family size. There is no consensus with regard to the relationship between household income and the demand for credit. Ferede (2012) makes the argument that households with lower incomes need to spend more of their income on consumption and will therefore have a higher demand for credit, while Chen and Chivakul (2008) argue that higher household incomes will lead to higher levels of credit demand due to higher levels of savings.

A negative relationship between a household's assets and the demand for credit is recorded by Duflo et al. (2008). They explained this by making use of an agricultural example: when a prospective borrower has a large number of livestock, he or she has less need to borrow money, because extra capital is not needed.

With respect to family size, there is a positive relationship between the size of the family and the demand for credit. This is because larger families have higher risk in terms of someone falling ill or other unforeseen expenses the family would need to incur (Tang et al. 2010).

2.4.3 Repayment and cost of microcredit

Repayment of credit

Burritt (2006) states that the demand for micro loans is limited by two main factors, namely the willingness and the capacity of the borrower to repay the loan.

He found that the capacity for smallholder farmers to repay their loans is extremely sensitive to the price of inputs, yields and the price of their crop at harvesting. The repayment capacity for farmers is also influenced by the structure of the loan and it is important that the repayment schedule should be flexible to align with the harvesting and marketing of the crop. This statement is supported by the study done by Labie et al. (2015).

The willingness of a borrower to repay his or her loan is as important as the capacity to repay the loan. Burritt (2006) found that the first and likely most important factor influencing the willingness of borrowers to repay their loans is the sustainability of the MFI and therefore the continuous access to the credit facility. Borrowers were found to be more inclined to repay their current loan with the prospect of receiving another loan.

Burritt continued to explain the importance of operational systems to enable the MFI to manage the loans properly, and that a good system needs to be implemented in conjunction with expertise within the field of microfinance.

Dorfleitner et al. (2017) evaluated various variables to establish the relationship these have with the default rates of borrowers on their micro loans. The variables evaluated were gender, age, marital status, length of the relationship between the borrower and the MFI, access to water, and the goods produced by the borrower (Dorfleitner, Just-Marx and Priberny, 2017).

In their study, Dorfleitner et al. (2017) found that gender did not have a significant effect on the default rate of the borrowers, and there is no difference in the default rates between men and women. This is supported by previous studies by Brehanu and Fufa (2008) and Godquin (2004). Emmanuel et al. (2018), however, found the contrary, stating that women are better managers of microcredit and have better repayment rates than their male counterparts.

Dorfleitner et al. (2017) also found that there is a significant negative relationship between the age of the borrower and the probability of defaulting on the loan. This means that the older the borrower, the lower the probability of default. The findings of Emmanuel et al. (2018) and Jumpah et al. (2018) are in line with those of the study by Dorfleitner et al. (2017), and they state that the probability of repayment increases at a rate of 1.2 percent as the age of the borrower increases due to the extra experience. Jumpah et al. (2018) go further to explain that this is not always the case for microcredit in an agricultural environment because of the high labour demands of farming. In agricultural microfinance, the repayment would reach a peak at a certain age and then start to decline again due to the borrowers being less productive at higher ages (Jumpah, Tetteh and Adams, 2018).

Dorfleitner et al. (2017) show that borrowers who are married have a higher probability of defaulting on their loan. This is explained by the increased strain on the scarce income that the household has. This is once again in contradiction with the study by Emmanuel et al. (2018) that made the surprising finding that, for every extra dependent a borrower has, the probability for repayment increases by 16 percent.

The length of the relationship between the MFI and the borrower showed no significant relationship, and Dorfleitner et al. (2017) could therefore not confirm whether the length of the relationship has a positive or negative relationship with the probability of a borrower to default on their loan. This is, however, in contradiction with the study done by Kocenda and Vojtek (2009) that states that “non-defaulting” behaviour is associated with longer relationships between the financier and the borrower.

The level of access to water was found to have a slightly negative effect on the probability of defaulting on the loan, as expected, but this variable was not significant, and the relationship

could therefore not be confirmed. Furthermore, the type of product produced by the borrowers had a significant effect on the probability of defaulting on a loan. It was found that borrowers who partake in agricultural activities had an overall higher probability of defaulting (Dorfleitner, Just-Marx and Priberny, 2017).

Adu, Owualah and Babajide (2019) have stated that the probability of borrowers defaulting on their loans increases when the size of the loan increases; therefore, when the MFI gives larger loans to the borrowers, they bear an increased risk of default. This is not in line with the study by Emmanuel et al. (2018), who found that the loan value could have either a positive or a negative effect on the repayment ability of the borrower. When a loan is too large, the borrower might end up using the loan irresponsibly and therefore not be able to repay the loan. At the same time, smaller loans would be easier to repay due to the decreased costs associated with the loan. On the other hand, Emmanuel et al. (2018) found that the loan size and repayment rate had a positive relationship, when the loan is used to increase the procurement of inputs. This is due to the resulting increased productivity and therefore the ability to be more profitable.

Emmanuel et al. (2018) further state that the interest rates associated with a loan are, and have always been, a critical point in the evaluation of microcredit because microcredit is almost always accompanied by high interest rates. They found that, for every unit increase in the interest rate, there is a 44% increase in the probability of borrowers defaulting on their loan. In contrast to this, Adu et al. (2019) stated that the interest rate of a micro loan does not have any significant effects on the probability of the borrower defaulting on his or her loan.

The study by Emmanuel et al. (2018) further elaborates the point that the repayment duration has a positive relationship with the default probability of a borrower. This means that, as the duration of the loan increases, the probability of the farmer defaulting on the loan also increases.

Cost of credit

Microcredit has received much criticism on the moral ground that the MFIs make these micro loans available to borrowers at comparatively high interest rates (Sandberg, 2012).

MFIs can be seen to always charge higher rates for loans as compared with commercial banks in the same country, and interest rates usually range anywhere between 20 and 70 percent. Sandberg (2012) further states that the global average interest rate for microcredit is about 30

percent. She mentioned that MFIs often justify this by comparing themselves with 'loan sharks' and local moneylenders who often have interest rates of 10 to 20 percent per month.

Table 2-2 shows a comparison made by Sandberg of the interest rates that can be expected in different developing countries from commercial banks, MFIs, and informal moneylenders. It is evident that the interest rates associated with microcredit are substantially higher than those of commercial banks are. The question is, can this be justified?

Table 2-2: Interest rates for various developing countries.

Country	Commercial banks	Microfinance institutions	Informal sources, e.g. moneylenders
Indonesia	18%	28–63%	120–720%
Cambodia	18%	~45%	120–180%
Nepal	11.5–18%	18–24%	60–120%
India	12–15%	20–40%	120%
Philippines	24–29%	60–80%	~120%
Bangladesh	10–13%	20–35%	180–240%

Source: Sandberg (2012)

Sandberg argues that the high interest rates that MFIs charge for microcredit are not immoral, and she found nothing to be wrong with interest rates as high as 70 percent. She argues that the default rates, high costs of transacting with these borrowers, and the cost of the funding do give a basis on which to ask high interest rates.

2.4.4 Input utilisation

Rapsomanikis (2015) evaluated the importance of inputs to smallholder farmers. He stated that fertiliser and seeds are used more intensively by smallholder farmers than are used by larger-scale farmers. Tanzanian smallholder cereal-root mixed farming systems typically use 22 kg of fertiliser per hectare, whereas the larger-scale farmers would only use 8 kg per hectare, and the same logic applies to seeds used by smallholder farmers. These more intensive strategies often lead to higher yields but could also give rise to higher risks associated with water resources being contaminated by agro-chemicals and associated health concerns (Rapsomanikis, 2015).

Rapsomanikis (2015) further explained that most smallholder farms use only family labour, with some exceptions where hired labour is used, especially during planting and harvesting. The capital-to-labour ratio is generally very low for these farmers due to the limited capital available to them.

The use of chemicals is very limited for smallholder farms, which means that weeding has to be done by hand. Weeding by hand does, however, require specific and more sophisticated knowledge and managerial skills, and this then results in higher costs for smallholder farmers in the short run (Rapsomanikis, 2015).

This makes it evident that the highest costs for smallholder farmers are those for fertiliser, seed and, when available to them, chemicals.

2.5 CHAPTER SUMMARY

This chapter discussed the importance of financial inclusion and the role it potentially plays in the finances of a community. It is also evident that the technological advances in terms of mobile wallets play a very important role in the inclusion of farmers and other rural stakeholders to enable them to easily transact with one another and to easily make payments like utility bills. MFIs show large potential in helping rural communities to increase their livelihoods and to enable small business owners to increase their profits. Increasing the money available to rural people enable them to increase their input procurement, and this will in turn lead to the ability to increase output and profits.

CHAPTER 3 AN OVERVIEW OF THE AVAILABILITY OF CREDIT TO SMALLHOLDER FARMERS IN MOZAMBIQUE

3.1 INTRODUCTION

The availability of credit to smallholder farmers in Mozambique is extremely limited as stated by De Vletter and Gardner (2019). Having said that, one immediately must qualify what type of credit is being referred to. When this is taken into consideration there are many difference sources of credit available. The recent publication by De Vletter and Gardner (2019) that discusses the different financial products available in Mozambique is proof of this, and most readers will be surprised by the number of financial entities listed, including a total of eight MFIs. Therefore, it becomes clear that one's view on the 'availability of credit' depends on the appropriate definition and circumstances. For example, the type of client that is being referred to, meaning in the case of a smallholder farmer, the size of the loan, the credit record of the client, the business plan, etc. Is the credit offered by a private sector financier (bank) or a government parastatal[4]? Is the credit offering part of a specific project, industry or region that is promoted? What collateral is required? Credit is always available if the client has sufficient collateral to offer.

In the case of this particular project, credit availability focuses on the farmers of Belas who have limited education and hardly have any collateral to offer, with most of them having small farming enterprises, measuring at the most approximately two hectares under irrigation and maybe a similar area of dryland. However, they are fortunate that they have their own land, have free gravity-fed water, and could produce three high-value crops a year. In general terms, one could say they have more opportunities to earn a higher income from agriculture and less risk. The question would then be, what source of credit should typically be made available to them? The next sections focus on some of the forms of credit available.

4 A company, agency, or intergovernmental organisation that is separate from government, but whose activities serve the state, directly or indirectly. Often, these entities receive financial assistance from government, or function with the aid of government laws or regulations.

3.2 OVERVIEW

De Vletter and Gardner (2019) report that, since the beginning of 2018, the prime rates of interest dropped from about 28 percent to under 20 percent. The period under review was also marked by a shift in government thinking about providing finance, which has usually been highly subsidised, and charged at negligible repayment rates due to government's reluctance to act on defaulters. Instead, the government is leveraging commercial bank lending to the agricultural sector through the creation of guarantee funds. Agricultural credit has been said to be difficult to obtain and expensive. De Vletter and Gardner (2019) are of the opinion that there is a wide variety of financial products available for the agricultural sector, with a broad range of conditions and costs (often subsidised). What they could not establish is how difficult it is to get loans from commercial banks, many of which remain under-capacitated in terms of evaluating and managing agricultural loans.

In the sections below, the loans available are categorised, based on government financial products, matching grants, and guarantee funds, followed by development finance, then commercial banks and microfinance, and finally equity finance and others. The focus is on credit available in Manica Province.

3.3 GOVERNMENT FINANCIAL PRODUCTS & MATCHING GRANTS

The government-owned National Investment Bank (BNI) was originally intended for financing infrastructure, but it has now diversified into managing donor lines of credit and government-funded guarantee funds. Previously, the partly government owned GAPI was usually approached for managing these types of funds and direct lending. Currently, the BNI is managing approximately USD 100 million worth of donor and government financed funds, most of which are supposed to target rural areas (De Vletter & Gardner, 2019).

The most likely potential source for credit under this category is the 'Fund for Agri-businesses and Entrepreneurship' (FAE). The FAE falls under the supervision of the Agency for the Development of the Zambezi Valley. The target sector is agriculture. Seventy-one projects have already been financed, to a value of MZN 65 million, with another 101 projects being currently analysed at a value of MZN 84 million. The latter projects were expected to have been approved before the end of 2019, but it could not be verified whether these were approved. Interest varies from 5 to 10 percent, and loans from MZN800,000 to 1.2 million. It could not be confirmed whether projects in Manica Province qualify for funding. However,

the size of the loans far exceeds the needs of an individual smallholder farmer, and loans will have to be channelled through an institution, such as a farmer cooperative.

Matching grants have become an increasingly popular way of financially supporting the agricultural sector. Up to around 2017, the African Enterprise Challenge Fund (AECF) played a very important role in the provision of grants and zero-interest loans to the agricultural sector, having granted up to USD 1.5 million to some of the better-known emerging agri-businesses. Since then, the AECF has launched lines of credit for renewable energy and crop seeds. The World-Bank-financed Catalytic Fund for Innovation and Demonstration (FCID) has provided a very similar product to the same target group (agriculture). Since then, several other grant schemes have been initiated, with a wide range of eligibility (geographic and sectoral).

Although several initiatives operate on a nationwide basis, it appears as though only two matching grants are applicable to agriculture in Manica Province, being RAMA BC (Land O'Lakes and CLUSA; USAID funded) and the World Bank Growth Poles Project – the FCID that was supposed to end in 2019. It is known that some of this money has been made available in Manica Province. The money is channelled through a credible institution and selected projects. For example, it is known that Westfalia Mozambique received money to be utilised in favour of their litchi outgrowers.

Loan guarantee funds (LGFs) are instruments used to incentivise banks to lend to selected beneficiary groups by reducing the exposed risk through guaranteeing an agreed percentage of any default that might occur. There are several loan guarantee funds (LGFs) that have been operational for several years, with new government ones being recently initiated through the BNI (FDA and INCAJU). The global DCA/SIDA guarantee fund has been operational in Mozambique for about 10 years, supporting agricultural finance through the microfinance commercial bank Opportunity Bank (now MBC – MyBucks Banking Corporation) and BTM (now Moza) bank. The LGF agreement with the BTM (Moza) was renewed at the end of September 2018. More recent LGF agreements have been concluded with Socremo and Banco Unico, but with no evidence of agricultural lending being supported.

MBC, until recently, used the DCA facility in Manica Province, but has since scaled back on agricultural lending. Their current position is not known. The facility offered 50 percent risk coverage, and the premium was negotiable. GAPI has one guarantee programme for which Manica Province qualifies, namely the Agri Garante. It provides 20–65 percent of value of a

guarantee, ranging from MZN500,000 to MZN12 million. Thembani International Guarantee Fund, a US sourced guarantee through Citibank, targets mainly larger companies. Apparently, they have ten clients in Mozambique and charge a three-percent premium on the loan guaranteed, but only after a thorough due diligence. The Fund for Agricultural Development (FDA), managed by BNI, guarantees MSMEs, nationally. It offers 80 percent cover of the risk, but only where loans are subsidised.

3.4 DEVELOPMENT FINANCING

GAPI is currently the only Development Finance facility in the country. It manages or delivers a wide variety of products, including micro and SME loans through donor-financed credit lines and guarantee funds. Prior to the dominance of the BNI, GAPI was the focal institution for managing and disbursing donor funds intended for stimulating private-sector loan financing (De Vletter & Gardner, 2019)

Despite its prominence, there appears to be only one 'programme' for which Manica qualified in 2020 (previous programmes had come to an end), namely general loans to all sectors from own funds. Interest in 2019 was 18–32 percent, but collateral to the value of 120 percent of the value of the loan was required. Needless to say, this placed it out of reach for smallholder farmers, except for a cooperative loan where the value of the sub-loans would be accepted as collateral.

3.5 COMMERCIAL BANKS AND MICROFINANCE INSTITUTIONS

Commercial banks have been very cautious in financing agriculture in Mozambique. The lack of title deeds as evidence of land ownership (title deeds are usual in many other countries) is part of the reason. Financing efforts were targeted towards large corporate entities and their outgrowers, and/or industries that were known to be profitable or seasonable and had a quick turnover of money. Examples of these industries are sugar, tobacco, and cotton. Lately, with the growth in exports, some export crop funding was also channelled towards macadamia and other tree crops such as bananas and even litchis. Commercial rates were applied, which were around 30 percent about two years ago, but, in line with general declines, could today be as low as 19 percent.

It is known that Banco Terra (which became BTM and then merged with Moza) mainly targeted the agriculture sector, while Standard and Barclays targeted the agri-exporting

industries. FNB is targeting a mixture of local and exporting corporates. BCI has, through USAID funding, accumulated experience in funding the cashew industry and is slowly building up its portfolio in SME agri-business lending. The rest of the banks have limited exposure, although all of them have some exposure since the government encourages agri-lending. Some would say that the Banco de Mozambique compels banks to devote a portion of their portfolio to the agricultural sector. Banks do not appear to have a unified strategy; some appear to increase their exposure, while others are downscaling. BCI, through their KFW credit line, has recently targeted the soybean production industry, while Moza (after the takeover of BTM) closed their agricultural desk in Manica, and MBC are downscaling their Manica operations. De Vletter and Gardner (2019) probably summarised it correctly, when they stated that a particular bank's portfolio has a lot to do with the staff and their exposure and experience in agricultural lending.

According to De Vletter and Gardner (2019), microfinance in Mozambique has gone into a serious decline, with only two commercial banks devoted to microfinance. One is Socremo, which has recently decided to re-constitute itself as a 'micro banco' (a category closer to a commercial bank), while the other, Opportunity Bank (now MBC), is focusing increasingly on salaried loans. Although MBC has had considerable experience in the provision of agricultural loans, partly due to support from the DCA guarantee funds, it has not made any notable effort to expand this portfolio. IFAD and the AfDB, through the Rural Finance Support Program, have helped create some 70 rural microfinance operators through the government's implementing agency FARE, in the hope of promoting more inclusive rural finance to complement the government's policy of bancarizacao. Unfortunately, only very few of these MFIs have survived, and only a handful (CCOM, Hluvuku and CPL) offer agricultural credit in limited areas of the country (all in the South).

The biggest benefit of being a microbank is the high return on capital that is possible when the microbank is well managed and the clients are monitored effectively, while the downside is the high risk associated with financing low-income individuals.

There is considerable potential for MFIs to play an important role in off-taker financing arrangements with aggregator companies, such as Mozambique Leaf Tobacco (MLT), the cotton companies (e.g., Olam), sugar companies, and various smaller aggregators such as poultry, maize, and fruit trees (De Vletter & Gardner, 2019). However, recent experiences with late loan approvals and the very high rates of interest charged by the MFIs do not bode

well for agricultural microfinance on a large scale, at least for the immediate future. Off-taker loans have, up to now, been restricted to seeds, fertiliser, and chemical inputs.

MBC still offers agri production loans, preferably coupled with an off-taker and by way of producer groups. Loan sizes range from MZN10,000 to MZN400,000, with interest at 4.2 percent per month and higher for the duration of the production season. Previously, most of the loan activities were focused in Manica Province. Socremo offers SME and micro loans in general, including agriculture, nationwide. Their required guarantees and interest rates have been as high as 58 percent. Many other microcredit operators exist, but none offer agricultural loans in Manica Province.

3.6 EQUITY FUNDS AND OTHER

The equity investors, Norfund and AgDevCo, have been operating in Mozambique for many years. AgDevCo originally targeted SME agri-businesses, with a pilot in collaboration with the Beira Agricultural Growth Corridor (BAGC) with 14 investees in central Mozambique. Problems emerged with these loans following the 2016 financial crisis and AgDevCo has since moved away from SMEs and is now partnering with some of the larger companies. Norfund has always worked with larger-scale investees.

There are a number of financiers under the category 'Other', but most are linked with Government projects. One worth mentioning is Hollard Insurance, which introduced multi-peril insurance for seeds (and possibly for other inputs) that allows mainly smallholder farmers to receive a replacement of their seeds in the event of a poor harvest due to a variety of causes that may have impacted on harvests, including weather. Although a good idea, seeds unfortunately make up only a small percentage of overall costs incurred to produce a crop.

3.7 CHAPTER SUMMARY

Almost all surveys relating to Mozambique's business environment have placed access to finance at the top in terms of the main constraints to doing business in Mozambique (De Vletter and Gardner, 2019). For agricultural and rural finance, the issue has always been accessing finance as well as costs attributable to risks (weather, disease, pests and unpredictable markets) associated with agriculture – compounded by the inexperience most banks have with assessing and managing agricultural loans. The lack of enthusiasm in

commercial banks to provide agricultural credit has been clearly demonstrated by the very limited uptake of the Agro-Garante Guarantee Fund of the DANIDA-supported Agro-Investe Project. More than 10 banks were enthusiastic signatories, but commitment to approving agricultural loans remains very low outside of what are considered fairly safe sectors: sugar, cotton, tobacco and larger, well-capitalised agri-businesses. The DCA-SIDA guarantee fund has had some impact on the agricultural portfolios of two banks influenced by the guarantee funds. However, one bank providing microfinance loans to out-growers and some solidarity groups has indicated that, without the guarantee fund, they will not continue with agriculture unless some of the risk is picked up by multi-peril insurance. The bad news for smallholder producers and SME agri-businesses has been that there is a shift away from smaller-scale loan clients, both by commercial banks and equity funds. In the longer run, it is likely that digital technology will make a huge step in the promotion of bottom-of-the-pyramid farmer loans. De Vletter and Gardner (2019) conclude their project summary by stating that an important lesson learned in this exercise is about how little knowledge exists of the financial products available, and how little effort has been taken to divulge this information.

CHAPTER 4 THE BELAS IRRIGATION SCHEME: BACKGROUND AND FARMER COMPOSITION

4.1 INTRODUCTION

Manica Province is situated in central Mozambique and is one of three provinces that form the Beira Corridor, housing one of the most crucial transport routes in Southern Africa, linking significant parts of Malawi, Mozambique, Zambia, and Zimbabwe to the main Indian Ocean port of Beira (Antonio et al., 2015). The province of Manica covers an area of 61,661 square kilometres and has a population of 1,911 million (Census of 2017), meaning that smallholder farmers are vastly dispersed across this area, at approximately 31 per square kilometre. The region is characterised by having suitable agricultural soil as well as a suitable agricultural climate, with abundant access to land and water resources, highlighting the region's profound agricultural potential (Silici, Bias & Cavane, 2015). In the Manica lowlands, where the target area of Belas is situated, the climate is classified as tropical humid to sub-humid, with a mean rainfall ranging from 850 to 1,000 mm, with a temperature variation between 22 °C in July and 29 °C in January. The dramatic rise in altitude towards the Eastern Highlands (e.g., Gorongosa) creates an orographic effect that produces high rainfall (PROIRRI, 2010). Agricultural production primarily takes place on land parcels ranging between 1.35 and 1.7 hectares in extent (Silici, Bias & Cavane, 2015, Borzaga et al., 2016).

Mozambique is endowed with more than 30 million hectares of arable land with significant agro-ecological diversity. The government has named the development of irrigation as one of its priorities for the development of agriculture and for rural development. To this end, it adopted a new National Irrigation Strategy, the implementation of which is materialising with the interventions such as those implemented under the PROIRRI. Three out of 15 hydrogeological basins highlighted by the Irrigation Strategy (Buzi, Pungue and Zambezi) are covered by the PROIRRI intervention. Within the scope of the project, the National Irrigation Institute (INIR) has benefited from institutional and capacity building to cater to its policy, strategic and operational mandates. INIR capacities to implement its policies were also reinforced. The project also supported government institutions in the preparation of

legislation for irrigation associations as well as the National Irrigation Plan, both approved by the Executive's Council of Ministers in 2015 and December 2016, respectively.

4.2 PROIRRI AND THE WORLD BANK IRRIGATION PROJECT

While not detracting from what has been said in Section 2.3, it is also important to record the investments that have been made through development projects. What was invested in terms of construction, if any, and services? What were the initial successes and what could be considered after a few years as the permanent gains? The Belas irrigation project is such a project. It formed part of a bigger World Bank project, where USD70 million was invested to help smallholder farmers to grow and sell rice and vegetables through rehabilitated and expanded irrigations schemes in the central provinces of Manica, Sofala and Zambezia (World Bank, 2017).

Over 6000 people have directly benefited from the Government of Mozambique's Sustainable Irrigation Development Project (PROIRRI). At completion, the project is expected to ensure irrigation over a total of 3,000 hectares, of which 1,700 are dedicated to rice production, 800 for horticulture, and 500 for contract production. Since 2011, the World Bank has supported PROIRRI by providing $70 million in financing, in addition to the $5.7 million allocated by the Government of Mozambique and a $14.2 million grant from the Japanese Government, bringing the project's total investment to $90 million. The objective of the project is to increase agricultural production and raise farmer productivity with new or improved irrigation schemes in the Provinces of Sofala, Manica and Zambezia in Mozambique.

The World Bank has classified the PROIRRI Sustainable Irrigation Development Project as a Sector Investment Loan (SIL), comprising an IDA Credit of US$50 million (*Author's note, as quoted in the 2010 Project plan)* (PROIRRI, 2010). The project objectives will be achieved through the implementation of two technical components and two components dedicated to management, coordination, and monitoring. The four components of the project are:

- Component 1: Institutional Support and Capacity Development. Objective: strengthen the policy environment, institutional capacity, and technical skills for the sustainable development of irrigation.

- Component 2: Investing in People and Infrastructure for Sustainable Irrigation. Objective: Develop a sustainable management of irrigation schemes and finance the infrastructure required to increase the productivity and profitability of irrigated smallholder agriculture.
- Component 3: Market-led Production and Value Chain Development. Objectives: facilitate production and market linkages through innovative technologies and access to finance.
  - Subcomp. 3a: Production enhancement, Value chain integration, and Market linkages
  - Subcomp. 3b: Financial services for irrigation and value chain development
- Component 4: Project Coordination. Objective: coordinate and monitor project activities and manage financial and human resources in an efficient and results-oriented manner, in accordance with the project's objectives and fiduciary procedures. This component includes overall project coordination, project M&E; Impact Evaluation; project FM, Safeguard and Procurement.

It is particularly Components 3 and 4, where reference is made to aspects such as production enhancement, market linkages, value chain development, and most important, financial support and/or service, that concern the Gestao de Cereais project. To date, no evidence has been found of this support (as documented in Section **Error! Reference source not found.**: **Error! Reference source not found.**), and although there must have been some given, nothing has remained in the Belas irrigation scheme. There was one exception where, until early 2019, several farmers in an area known as Campo Quatro produced baby-corn on contract for a company called Campanha de Vanduzi, a typical outgrower arrangement. The company has, however, since terminated all outgrower arrangements. Another two agro-processing companies operated in the area namely, Agriza[5] and AusMoz[6] but it could not be confirmed if they had any off-taker arrangements with farmers. If they did, these do not exist anymore (PROIRRI, 2010).

Thanks to PROIRRI interventions, the irrigated area in the Vanduzi fields has been expanded. Newly built canals use gravity to encourage a flow of water along the fields, covering 20 times the area initially irrigated. In the district of Vanduzi alone, the project built 11 such

5 Agriza is a company that produces and markets bananas and litchis.
6 AusMoz Farm Holdings is a company that produces and markets bananas and litchis.

irrigation schemes, covering a total area of more than 1,500 hectares, which is used mainly for the production of vegetables and cereals.

As with Vanduzi, Sussundenga is another district now flourishing thanks to new irrigation schemes. In the neighbouring provinces of Sofala and Zambezia, PROIRRI's focus is on rice production, a priority crop for the Government of Mozambique. The districts of Buzi, Mopela, and Morrumbala are some of the biggest beneficiaries in the provinces receiving PROIRRI's 'matching grant'. The grant funds 70 percent of the cost of acquiring production kits that cover a standard area of about 0.2 hectares, consisting of improved seeds, fertilisers, and pesticides. The remaining cost of 30 percent is covered by the farmers themselves. Likewise, the scheme co-funds 85 percent of the total cost of acquiring equipment for animal traction, as well as agro-processing machines.

According to Boaventura (2019), ninety-five million meticais was the amount applied in the last five years in the construction of eleven irrigation systems to boost agricultural activity and increase food production in three districts of the province of Manica. The districts that are benefiting from the systems are Báruè, Vanduzi and Sussundenga, serving a universe of 350 producer families, organised in associations.

The programme was financed by the World Bank and was implemented by the Sustainable Irrigation Development Project (PROIRRI), and currently covers an area estimated at 394 hectares. Boaventura reported that the coordinator of the Sustainable Irrigation Development Project in Manica, Leonardo Lucas, has said that the eleven irrigation systems are being used in the production of vegetables and cereals. Leonardo Lucas said that the systems are stimulating agricultural production in the three regions of Manica, considered strategic for agricultural practice. The programme commenced in 2011 and was initially expected to be completed at the end of 2012. In the first phase, PROIRRI invested MZN 95 million (approximately $3.2 mil in 2011) in the construction of eleven irrigation systems that are helping the subsistence farmers to produce more food.

According to Leonardo Lucas, it was noted that production levels had increased after completion. He also said that, currently at the time, other irrigation systems were under construction in some regions of the province of Manica. The new irrigation systems would irrigate a total of 780 hectares. He said that of the 780 hectares, 243 would be irrigated from September 2017, which means that the new irrigation systems will increase the number of beneficiary producers. To assess implementation levels, a World Bank mission visited some

food production fields in the Belas area, Vanduzi District, in May 2016, where the funds made available by that global financial institution were being used and the producers' difficulties assessed.

4.3 PROFILE OF AN AVERAGE BELAS FARMER

4.3.1 Field size

Farmers, on average, have access to a maximum of approximately two hectares of irrigation fields, and approximately the same area under dryland.

4.3.2 Access to irrigation

The source of water is the rainwater that accumulates in the catchment area, in the nearby mountains. Barring any serious droughts, the water supply is steady throughout the winter months. As part of the World Bank project, some catchment walls were erected, as well as channels and/or pipelines feeding the water out of the maintains. Water is gravity fed all the way to the fields, although there are some fields, mostly new ones, where farmers use water pumps for the "last mile".

4.3.3 Electricity

Electricity is supplied to the village residential town of Belas. Houses are spread out over a large area, but none of the supply lines go out to the fields. Water pumps are therefore mostly petrol driven, and in some cases, by diesel. Lately, solar panels combined with electrical pumps are also used.

4.3.4 Cell phone, type of phone and mobile wallet

In the village of Belas, mobile network reception is mediocre, while in the nearby fields there is virtually no reception. There are two popular operators among farmers, namely Movitel and Vodacom, of which Movitel offers much better coverage. A 3G signal is limited to a few spots, and with that, internet access. Vanduzi, which is the nearest town to Belas, approximately 10km on the main road, has full mobile network coverage. The third network, MCel, is very low in popularity, in general and specifically among farmers, and for all practical purposes, only has coverage in towns. During the day, when farmers go to the fields, they can often not be reached them on their cell phone. The converse is also true, and other

than making calls, farmers can also not transact on their phones. Many farmers have two network cards – Movitel and Vodacom. The main reason is to expand their coverage possibilities.

4.3.5 ID and NUIT

Mozambique has seven different documents that are considered as being legal proof of identification, namely:

1. Identification card (ID)
2. Driver's licence
3. Voter card
4. Birth certificate
5. Passport
6. Military ID
7. Employee ID card.

In this study, emphasis is placed on farmers who possess an ID card, because presenting a valid ID card is a prerequisite for opening a bank account at traditional commercial banks. Most farmers have identification cards, although there are still some who have not applied for their ID cards. There is also a problem in that the Mozambican Government issues ID cards that are valid only for five years to holders younger than 40 years, and ten years if the holder is between the ages of 40 and 50, while ID cards issued to cardholders older than 50 years do not expire. The ID example below in Figure 4-1 is an example of that for a farmer who applied for the ID card when at the age of thirty-six, and therefore the ID is only valid for five years. In the case of quite a few farmers, the IDs have already expired. The process of obtaining or renewing an ID card could take many months.

Figure 4-1: Example of ID document
Source: Gestao de Cereais (2020)

A survey led by Gestao de Cereais was done in 2017 to gather information on 324 farmers in the Belas community regarding their ID, NUIT (Mozambique tax number) and cell phone numbers. The survey also asked farmers whether they were in possession of a mobile wallet and/or a bank account (Figure 4-3). In this survey, only 41 percent of participants were able to supply Gestao de Cereais with their ID number. The reasons for this low value can be explained by various factors, including farmers not knowing their ID numbers by heart, not carrying their ID documents with them, and having not yet applied for an ID document. Irrespective of this, the findings can be considered as consistent with the findings of the survey by UT Grain Management that was done on behalf of Fintrac (2018) which states that 50 percent of smallholder farmers have ID cards. This is supported by the data released by CGAP (2016) that shows 50 percent of smallholder farmers have a government-issued ID.

By making use of the database that will be discussed further in CHAPTER 5, Gestao de Cereais established that, for the farmers' part of the micro-financing project and have a farming operation in the Belas area, 92 percent of the 142 participants had an ID card. This percentage is only applicable to farmers who applied for loans at Gestao de Cereais. While the project prefers that farmers be in possession of an ID card, it is not always a prerequisite.

NUIT is a Portuguese acronym and refers to the local tax number. It stands for 'Numero Unico de Identificacao Tributaria'. Farmers would typically obtain a letter, followed by a NUIT card (illustrated in Figure 4-2). Lately, cards are rarely being issued.

Figure 4-2: Example of NUIT card
Source: Gestao de Cereais (2020)

The survey conducted by Gestao de Cereais showed that, of the overall 324 farmers surveyed, only 24 percent could provide a NUIT number, while 55 percent of the farmers participating in the Gestao de Cereais project were in possession of a NUIT number. This is a very big stumbling block for these farmers, because they need to provide a NUIT document to enable

them to get a bank account from a commercial bank. Only about 60 percent of all male farmers are in possession of a NUIT number, while the percentage for women is significantly lower.

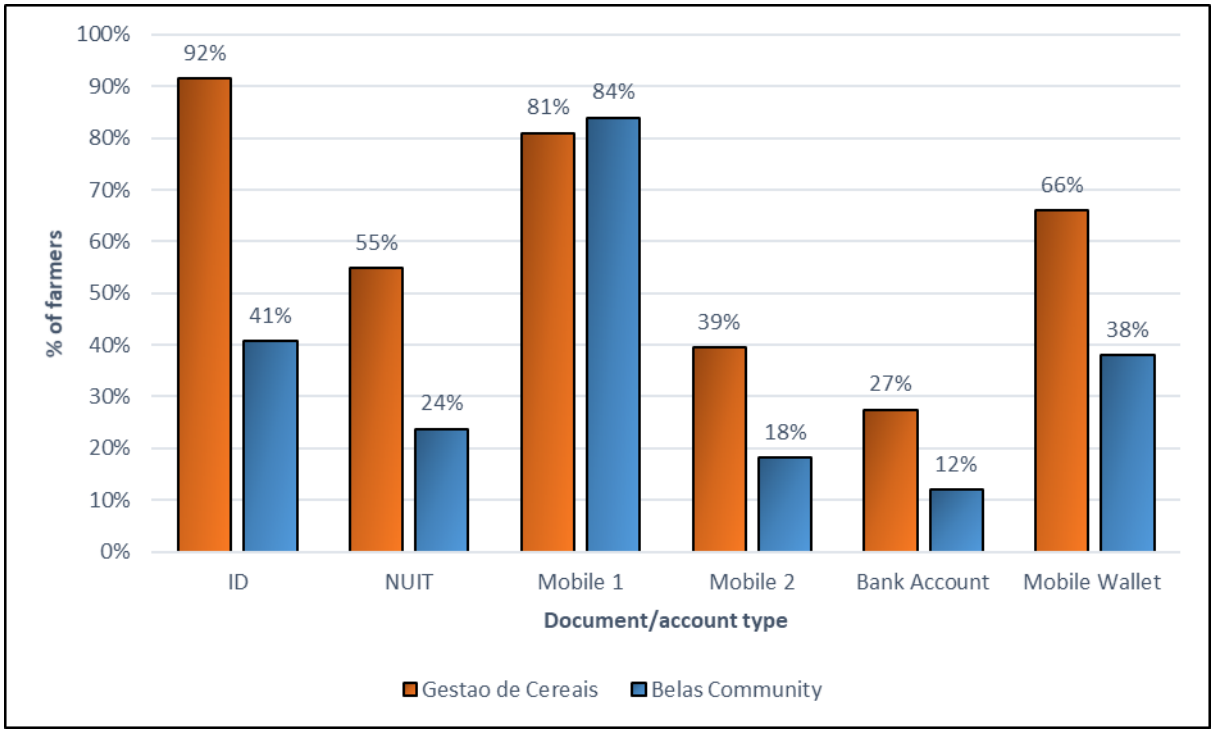

Figure 4-3: Documents and accounts gathered and verified in the Belas community in respect of participating farmers in the Gestao de Cereais project.

Source: Gestao de Cereais (2020); Fintrac (2018)

4.3.6 Bank accounts & closest banks and ATMs

Many farmers do not have a bank account. Figure 4-3 shows that in the Belas area, only 12 percent of the farmers who took part of the survey indicated that they have a bank account, while the CGAP (2016) survey indicated that only 10 percent of farmers have a bank account registered in their own name, although a further 5 percent use a bank account registered on someone else's name. When focusing only on the farmers who participate in the Gestao de Cereais project, this figure increases to 27 percent, which can still be considered as low.

Cash is still the preferred medium for trade. Lately, mobile wallets are gaining popularity (see the next section). Although all the major banks are represented in Manica Province, most are limited to Chimoio. Only Moza bank maintains a branch in Vanduzi town, with an ATM linked to the bank, while BIM also has an ATM in Vanduzi town, but does not have a branch. The distance between Vanduzi town and Chimoio centre is about 40 km and the travel time is approximately 30 minutes. However, public transport could easily take 45 minutes. It is also

not only the availability of branches, but also the quality of the network (for banks) that is often a problem.

4.3.7 Mobile networks and mobile wallets

As mentioned in Section 4.3.4 ‘Cell phone, type of phone and mobile wallet’, cell phone reception is limited in the Belas community. Farmers in this community prefer using the Movitel MNO, because this network operator is aimed at serving rural mobile clients and has better reception in the rural areas. Figure 4-3 illustrates the fact that 81 percent of the farmers who are part of the Gestao de Cereais project have an account with at least one MNO (usually Movitel), while 39 percent of the farmers have an account with two MNOs, one account being with Movitel and the other with Vodacom. This is very high in comparison with the average across Mozambican smallholder farmers, which reflects only 46 percent of farmer households as owning at least one phone (CGAP, 2016).

Both Vodacom and Movitel offer mobile wallet facilities. M-Pesa is linked to Vodacom and eMola to Movitel. Given the limited accessibility of bank branches and ATMs, mobile wallets are growing in popularity. Although Figure 4-3 shows that only 38 percent of farmers in the Belas area have a mobile wallet, this is still considerably higher than the percentage of farmers who have a bank account (12 percent). For farmers taking part in the Gestao de Cereais project, 66 percent were recorded as having mobile wallets from either Vodacom or Movitel.

Many farmers have two network numbers – Movitel, which is popular (and cheaper) for calls, and Vodacom for calls, but specifically for their mobile wallet facility. M-Pesa is fairly expensive, with fees of approximately 1 percent. This may not be excessive, but one percent needs to be paid to upload cash (referred to as cashing-in) at an agent, and one percent again when you pay or transfer money. The person receiving the money will also pay one percent when cashing-out, if they need to acquire cash money instead of having money in their mobile wallet. The daily maximum for transferring money is MZN 25,000. Although fees are charged on a sliding scale, these could quickly add up and be more expensive when compared with the banks. Because of the sliding scale, the fees on larger amounts are capped, and fees as a percentage could come down significantly. Farmers nowadays are also not necessarily cashing-out, meaning the cash stays within the M-Pesa network, which has also brought down costs significantly. The largest benefit remains convenience, which translates into

increased productivity. There is definitely a growing trend among farmers in the usage of M-Pesa.

4.3.8 Financial inclusion

As mentioned previously in Section 2.2 ‘Financial inclusion in the sub-Saharan Africa (SSA) region’, financial inclusion is defined as the availability of financial services to all members of the economy and can be measured by making use of the index of financial inclusion (IFI) (Sarma and Pais, 2010).

For the purpose of this study, “financial inclusion” is defined as *farmers that have access to a bank account and/or a mobile wallet*, and it is noted that the IFI for this interpretation would be low. The survey conducted by Fintrac, as depicted in Figure 4-4, shows that, for the sample of farmers in the Belas community, 40 percent are classified as being financially included, while the comparable figure for farmers who participate in the Gestao de Cereais project within Belas is 72 percent. These farmers are encouraged, but not obligated, to open these types of accounts and are educated on the benefits that these accounts hold for them. It can also be seen that farmers who are financially included pay off their loans faster, on average, and this will be discussed further in section on ‘Repayment of credit’ in CHAPTER 7.

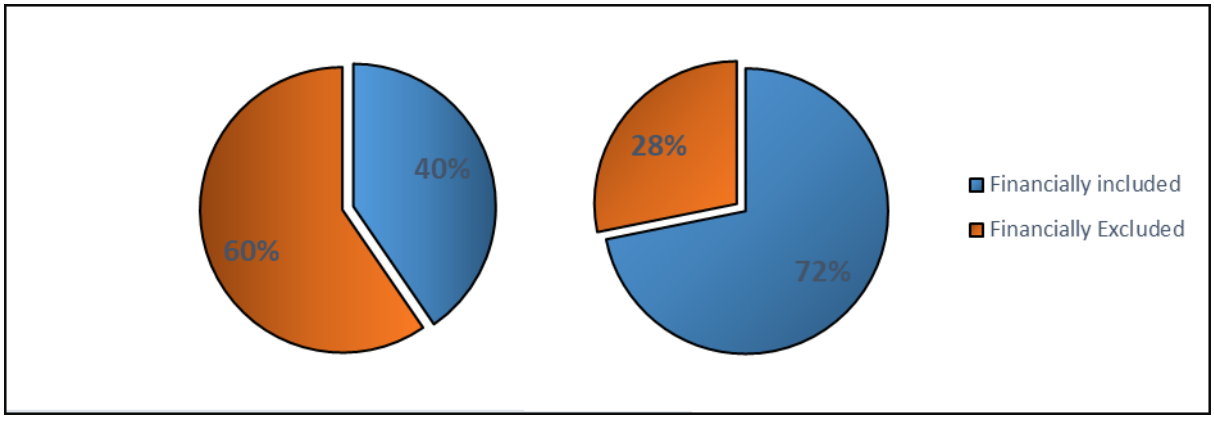

Figure 4-4: Financial inclusion of smallholder farmers
Note: Left chart – All surveyed farmers in Belas. Right chart – Belas farmers, part of the Gestao de Cereais project
Source: Gestao de Cereais (2020)

Age also has an impact on the willingness and ability to be financially included, especially when referring to having a mobile wallet. Due to the continuous advancements in financial technology, younger individuals are usually faster to adapt to changes in technology, and therefore they are more prone to become financially included. This is supported by the study

by Mombeuil (2020) that showed that 67,5 percent of individuals who adopt mobile wallets are between the ages of 18 and 30.

Figure 4-5 illustrates the percentages of farmers who are financially included within the different age groups. The financially inclusive percentage for farmers from 21 to 40 increases as the age of the individual increases. After the age of forty, the financially inclusive percentage decreases again. This is in line with the study done by Zins and Weill (2016) about the determinants of financial inclusion in Africa that states that financial inclusion has a positive, non-linear relationship with age, and therefore the older the individual is, the more likely he or she is to have a formal account, but only up to a certain age, after which the probability again diminishes.

Of the 84 farmers in the 21 to 40 age group, 71 are financially included, amounting to 85 percent. This contrasts with farmers older than 40, where only 56 percent (average) are recorded as being financially included.

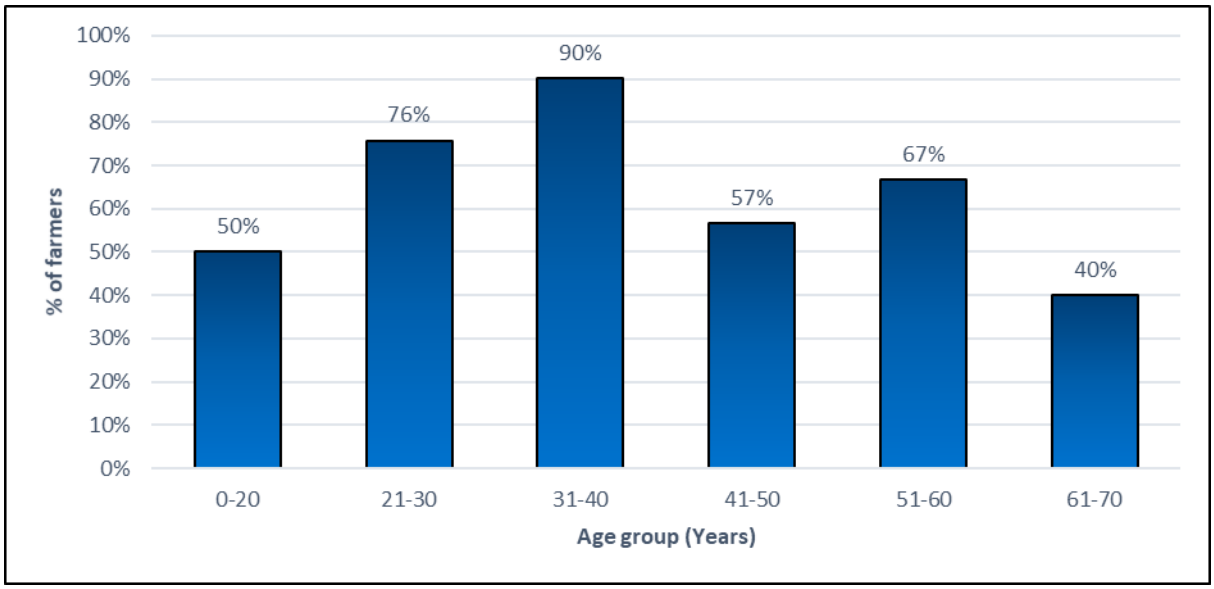

Figure 4-5: Percentage of farmers within an age group that is financially included.
Source: Gestao de Cereais (2020)

Although Gestao de Cereais encourages women to take part in the project, only 15 of the total 142 farmers are women. This, in turn, means that the data on women with respect to financial inclusion and loan uptake/payment is limited, and these values will only be regarded as estimates and will be supported by findings in other literature studies. It is however evident in Figure 4-6 that of the 15 women participating in the project, only 27 percent are regarded as financially included, while 77 percent of the men are considered as financially included.

With respect to the adoption to mobile wallets, the analysis by Mombeuil (2020) found that only 36.1 percent of participants with mobile wallets accounts were female, while the predominant 63.9 percent of the participants with mobile wallets were male. Furthermore, Zins and Weill (2016) have stated that "being a woman significantly reduces the probability of having a formal bank account". However, they did state that they found no significant distinction between men and women regarding having access to formal credit.

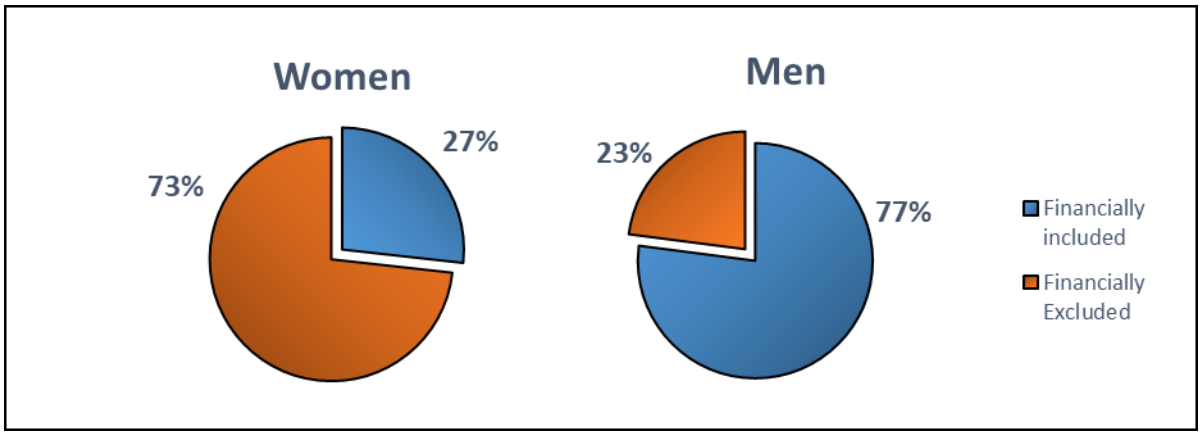

Figure 4-6: Financial inclusion of men and women, part of the Gestao de Cereais project

Source: Gestao de Cereais (2020)

4.4 CHAPTER SUMMARY

This chapter describes the importance of the irrigation programme that helped the farmers within this area to enable them to successfully operate their farming operation. The farmers benefited from this programme and was able to increase their production of agricultural products due to the extra water that is available to them. This chapter also focusses on the importance of creating a profile for all the farmers part of the programme. This enables the managers of the programme to have a better understanding of the farmers that needs to be managed and enables some analytical evaluation regarding the demographics, location, age and gender of the farmers. By doing this, the managers are able to identify key aspects that can be improved, for example increasing the financial inclusion among the group.

CHAPTER 5 THE DEVELOPMENT OF A DATABASE AND THE IMPORTANCE OF RECORD KEEPING

5.1 INTRODUCTION

There is certainly no lack of development projects in Mozambique. However, if there is one aspect that they all have in common, it is that a new project hardly ever has the benefit of having access to information collected by previous projects. This does not refer to a project report, where data has already been aggregated and analysed, but rather to data and detailed information or results that are carried over from one project to the next. This is despite the fact that many of the projects target the same farmers and/or agro-dealers, and/or agro-processors in the same areas. It is hard to tell why this is the case, but maybe it is because of competition between project contractors and it is not required from them to orderly capture and make data available for use by subsequent projects. Van der Vyver (2014) has commented in project reports that no records of farmers were found to be available when he commenced with a new warehouse receipt project, under contract for USAID Trade Hub. It was as though each project had kept their records on a standalone PC or in a file cabinet, and these records were deleted or ended up in the waste bin at the end of a project.

Today, client data, at least for the last decade, is key to starting a new project or business, and to ensuring their on-going success. There is a reason why we often read about client records held by large companies being hacked. Unfortunately, this is often done with devious motives. However, many legitimate companies specialise in keeping and selling client records, similar to the old mailing companies that distributed advertisements.

At the launch of Gestao de Cereais, a measured decision was taken to develop a database comprising records for all farmers, suppliers and off-takers. A view was taken that a profile needed to be compiled of each client or potential client. Knowing your client (KYI), in this case the farmer, is the only way to guarantee long-term success. Gestao de Cereais decided to build on the database success that initially started with the warehouse receipt project launched in 2015 by USAID Trade Hub, when APPSolve designed a warehouse receipt and database system for the project, and brand-named the software as ‘GlobalTradeAPP’. The software was further enhanced in subsequent projects in Zambia for the Zamace Commodity Exchange; in financial and business training for Opportunity Bank in Mozambique; in mobile

wallet training for Fintrac in Mozambique; and in a pilot project for warehouse receipt financing in Pakistan.

The use of the database is crucial in analysing the data for the farmers and their loans, as it allows access to the live data at any time, any place if there is a stable internet connection. The database allowed for all the data used in this research to be extracted and analysed.

5.2 DATABASE SOFTWARE – GLOBAL TRADE APP OVERVIEW

The Global Trade App system is cloud based. All that is need is internet access, and there is no need to download anything. It is built on Oracle 12C technology and the frontend is APEX. When logging into the system, each access is user specific, with certain rights being assigned to each individual user. This means that a user can only access (view and/or print) certain data according to his or her security clearance and can only capture certain data.

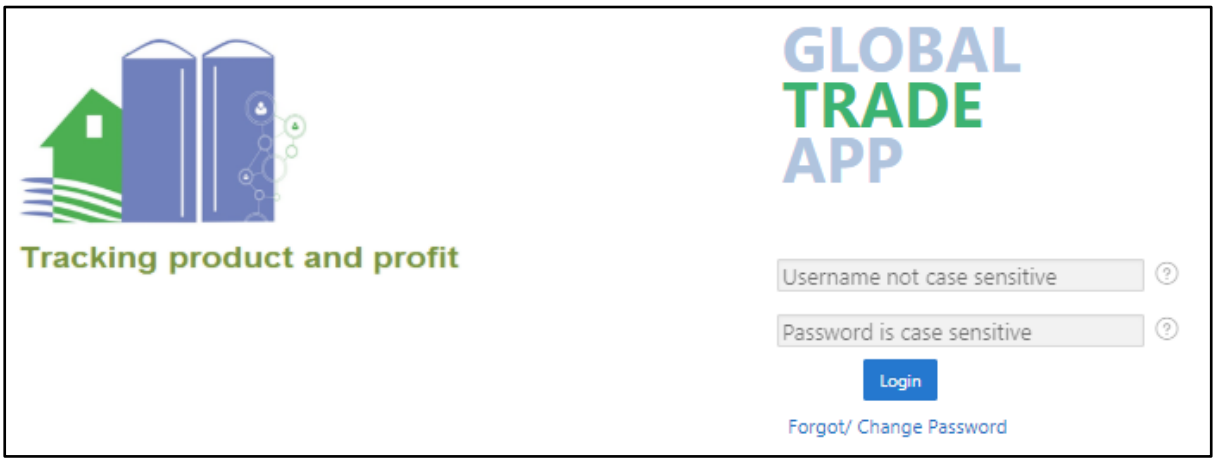

Figure 5-1: Global Trade App landing page
Source: APPSolve (2020)

A record or profile is created for each new farmer. The user would go to the menu on the left where she or he has the choice of several functions: choose 'Administration' and then 'Individuals' and 'Create New'. This will send the user to the individual's landing page.

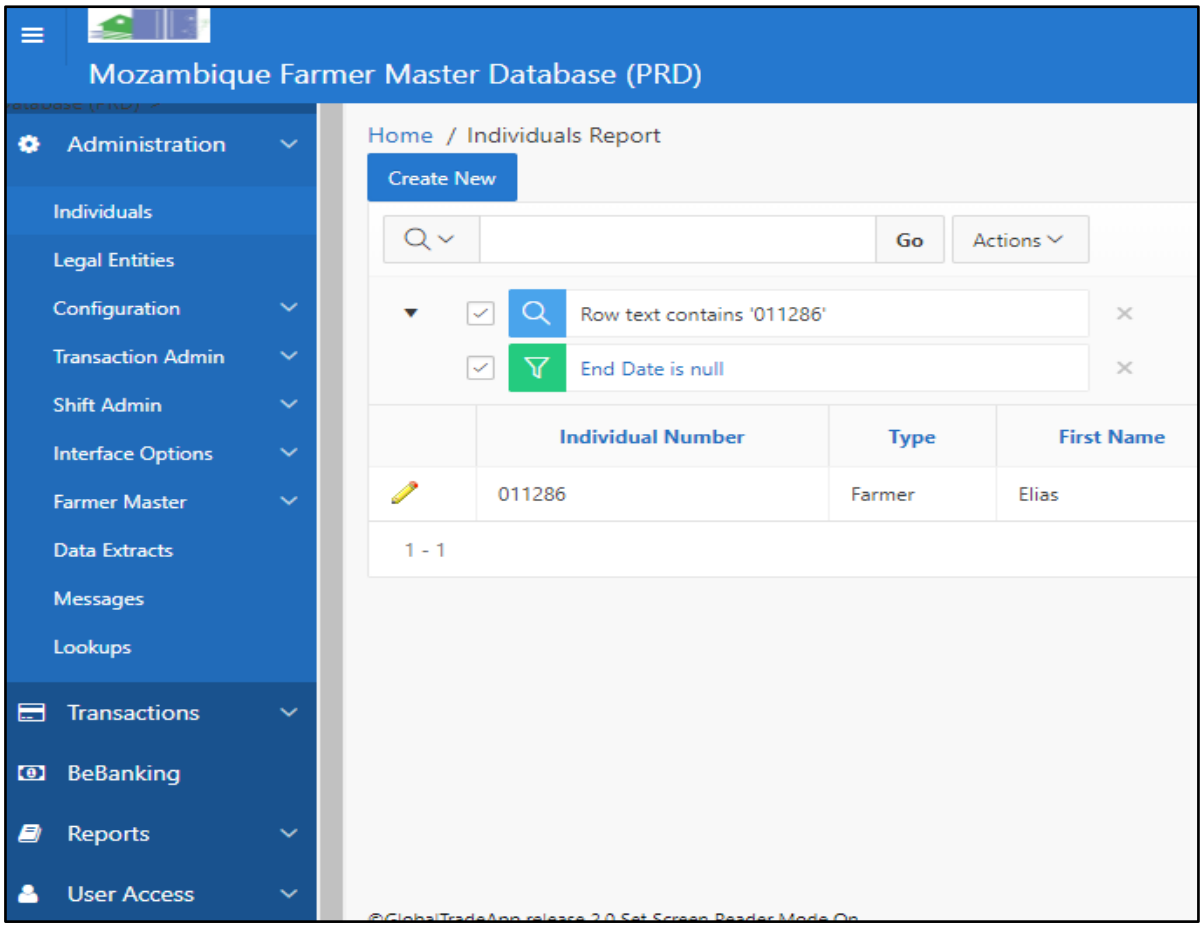

Figure 5-2: Administration – Create new record (farmer) profile.
Source: APPSolve (2020)

Only the most basic data is captured on the landing page, which does not require any security clearance. An extract of this is shown below in Figure 5-3.

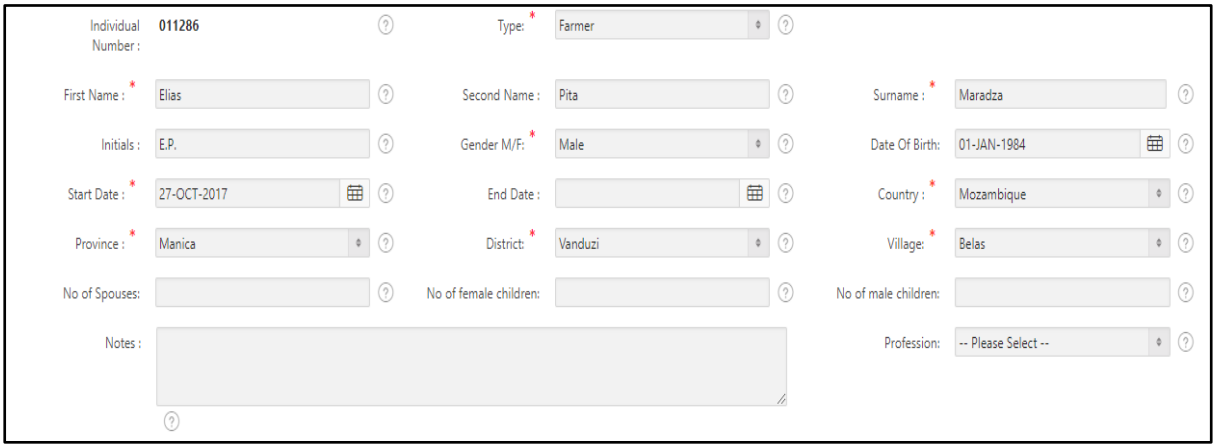

Figure 5-3: Record landing page – capturing of basic data
Source: APPSolve (2020)

Detailed and more secure information is capture in what is referred to as the 'Child Tables'. Each Child Table has templates where unlimited information can be captured and processed, for example, the different types of identification numbers.

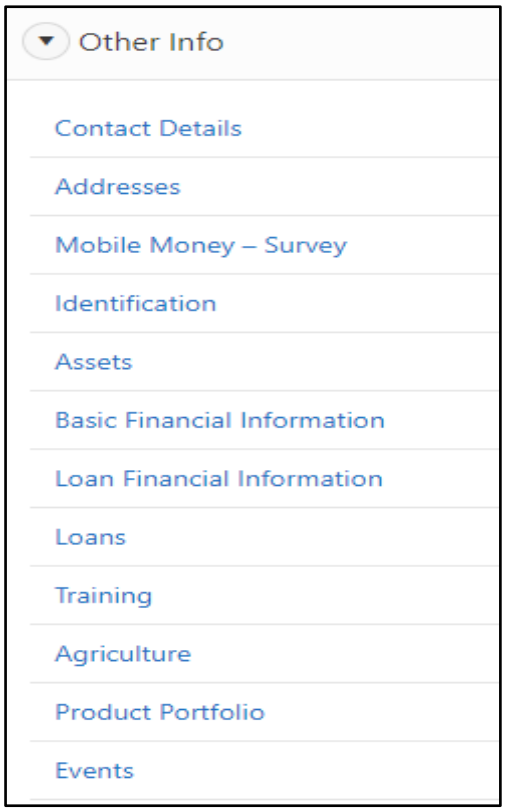

Figure 5-4: Child table for capturing of detailed information.
Source: APPSolve (2020)

The system allows for all relevant documents and images to be uploaded and categorised by 'Document Type' for easy use and insertion into reports. These documents are then accessible to the user from any device with an internet connection.

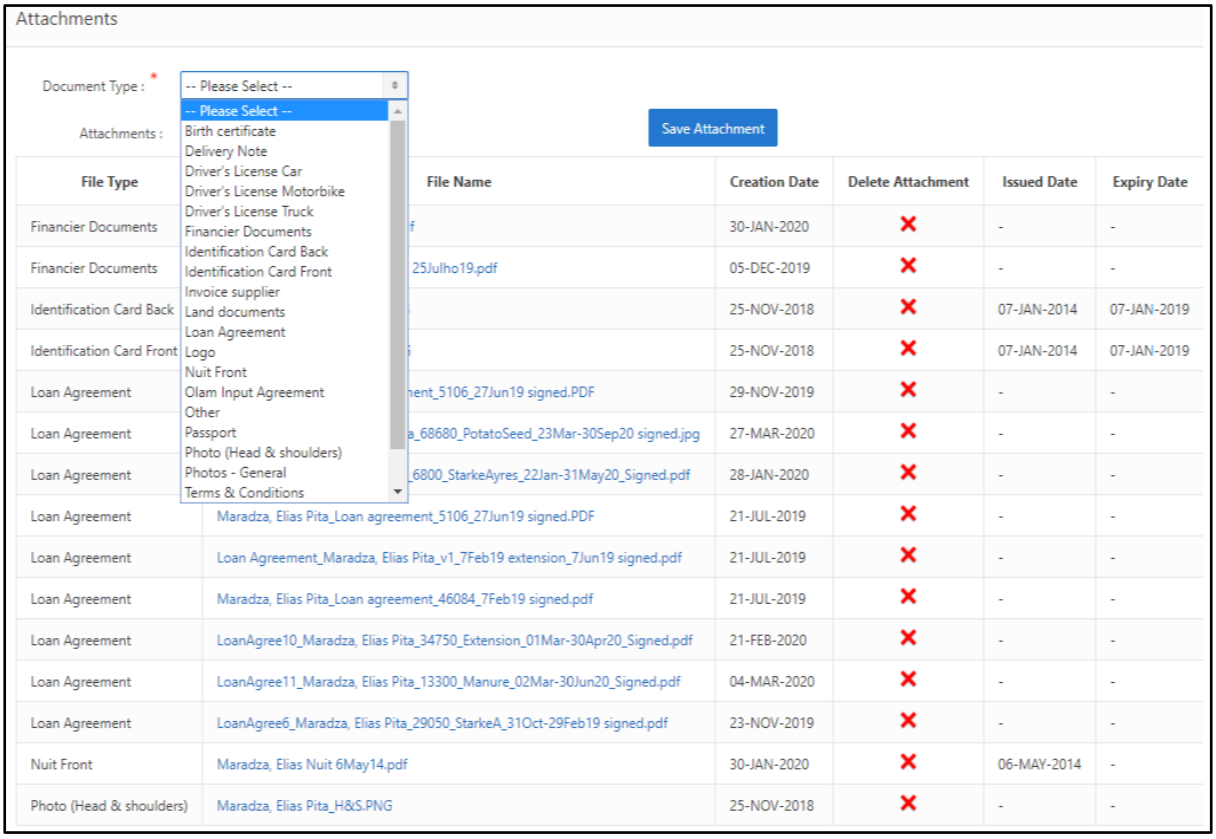

Figure 5-5: Attachment of documents
Source: APPSolve (2020)

Lastly, the system allows for entities to be linked to each other – 'parent and child' – which makes for easy extraction of information (e.g., farmers) connected to a particular entity or group of entities (e.g. a fertiliser supplier). Figure 5-4 below illustrates a situation where a farmer is linked to various parent entities, together with the type of category.

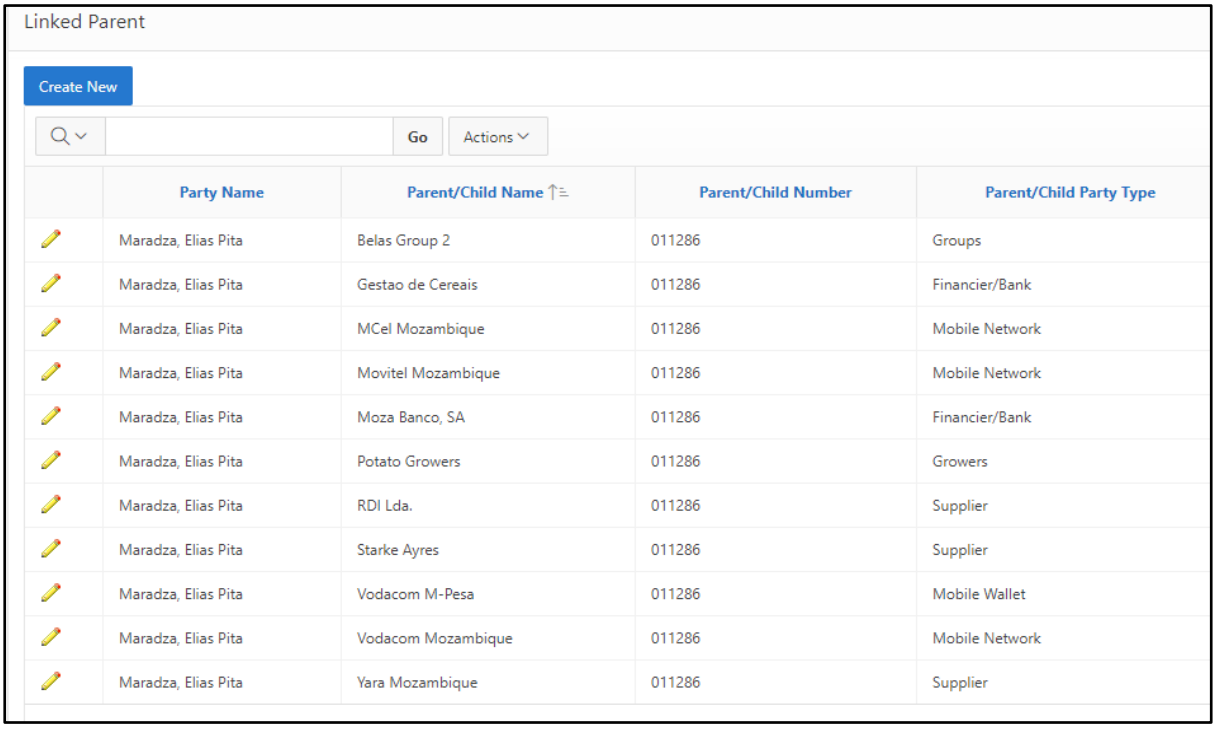

Figure 5-6: Linking records to entities.
Source: APPSolve (2020)

After a farmer's profile is completed, the database allows the user to print a "Client Profile", stipulating all the most important and relevant information of the specific client, as depicted in Annexure 1.

After all the basic information has been loaded for a farmer, the database makes provision for capturing data related to the production of the specific product produced by the farmers. This allows the user to load the loans taken up by the farmers, as well as all the production inputs and sales for the specific farming operation. This can be seen in Figure 5-4, reflecting the 'Product Portfolio'[7] and 'Loans' child tables which are used to capture these operational data details.

The product portfolio (an example is given in Annexure 2) enables a user to capture the input products and sales associated with a product per production season. The system then automatically calculates the profits made by the farmer and further display the profits per hectare.

7 'Product portfolio' is the term used on the system to describe the input products used to produce a product, as well as the sales generated from the production activities.

In the ‘Loan’ child table, the user is able to capture all the aspects relating to the loan taken up by the borrower, for example, base loan value, interest rates, commencement date, due date, and the fees. The system then calculates the applicable repayment value that the farmer would need to pay on the due date.

The system also allows a user to allocate the applicable input products towards a loan, as it is important to be able to establish what the loan is used for and whether the loan is allocated to the intended purpose.

Loading the ‘Product Portfolio’ and ‘Loans’ for the farmers is crucial for the record-keeping purposes of the MFI, and this enables them to run reports regarding the repayment rates, use of loans, repayment schedules, etc., of the farmers by making use of the reporting functionality that the database offers.

5.3 CHAPTER SUMMARY – VALUE OF A DATABASE

The purpose of a database in these types of development projects is not only to claim that thousands of records of farmers are available. It is the opinion of Gestao de Cereais that the quality of record-keeping is much more important than the numbers are. In the first place, any project needs a basic profile of its client. A farmer that is in possession of the basic documents and information, such as identification document (ID), tax document (NUIT), mobile phone, address (or location) and association membership, to mention only a few, offers a much better proposition to engage with in respect of training and, ultimately, finance. Even the Government of Mozambique requires, for good reasons, that a farmer who wishes to open a bank account has to be in possession of a valid ID and a NUIT. He or she then also has to provide a head-and-shoulders photo and fingerprints, as well as some other information.

For project purposes, such records should be stored and preferably be updated (maintained) regularly and be easily accessible. This applies both to the profile of the individual farmer and that of a community. In such a case, a project or potential project has a much better chance of succeeding. By collectively analysing the basic farmer profile records of a community, such as in the case of Belas, the project manager, will know what level of additional training or education is required for your project to become a potential success.

The database also allows a user to capture production data (inputs and sales) for farmers, which would enable the profitability analysis of the farming enterprise, if all the data is made available to the user of the database. The database also allows the capturing of loan details. (It was the data on these loans that were made available by Gestao de Cereais for analysis and were used as research data in this study.)

The project manager or owner of the business could then aggregate and analyse the data to compile a report that would enable him or her to ensure the success of the project or business.

CHAPTER 6 AVAILABILITY, UPTAKE OF CREDIT AND INCREASE IN PROCUREMENT OF INPUTS

6.1 GENERAL OBSERVATIONS

This study aims to prove that smallholder farmers who lack access to credit, will in most cases take up credit when offered the opportunity to acquire credit. This then will enable them to produce increased and better-quality crops by making use of inputs like new seed, fertiliser, herbicides and pesticides that would otherwise not be available to them.

Group vs. individual loans

Gestao de Cereais started off by making credit available to farmers in the form of group loans. However, some farmers in these groups fully repaid their loans in time, and even early, but others paid late or defaulted. If the group concept were to have been applied in full (meaning no new loans to the group members unless all have paid), it would have meant that credible group members would forfeit the opportunity to take up further loans. This would also have been bad for the credit provider, since it would miss out on business with potentially the best clients. Accordingly, the group loan concept was quickly abandoned. This experience matches earlier views noted by Greif (1994). He stated that, for joining liability to be successful, there are certain aspects that need to be considered within the society involved, namely a level of trust between the role players and knowledge amongst the role players participating in the group loan. This group loyalty is needed for group members to acquire the ability to “impose social sanctions” on the players who default on their loans. Clearly in the case of Belas and Gestao de Cereais, such group loyalty does not exist.

Input procurement

The next important aspect of the study was to determine whether, with the availability of credit, the farmers would increase their procurement of inputs, over time.

The most important function of the loans and the Gestao de Cereais project is to facilitate the growth of smallholder farmers by providing them with training, followed by credit and later with assistance in their crop production. The increase of inputs used by the smallholder farmers will be analysed in Section 6.3 ‘Increase in procurement of inputs’.

6.2 UPTAKE OF CREDIT

Loan uptake rate

Referring to the uptake of credit, a distinction can be made between 'new' farmers taking up their first loan, and therefore joining the Gestao de Cereais project for the first time, and farmers who are already part of the project and who take up a consecutive loan. This distinction is very important due to the training component that accompanies microcredit. This means that, when a farmer takes up their first loan, much time needs to be spent on managing and following up on the farmer to ensure their understanding of the procedures and institutions accompanying this loan. On the other hand, a farmer who has already paid off a first loan is more familiar with the process, and the cost associated with a second loan is therefore lower. The risk associated with a farmer defaulting on their second loan is also lower, because these farmers have already shown that they value the credit by making use of another loan, and they understand that their credit record is important when they want to take up their next loan. It is the no surprise that a key objective of Gestao de Cereais is to build a medium- or long-term relationship with a client.

Figure 6-1 below firstly depicts the number of new farmers joining the project (top graph), therefore getting their first loan, in each month from October 2018 to the end of July 2020. The initial uptake of new loans was relatively high, as expected, and the farmers of the Belas community started taking up loans as soon as they were made available to them. Overall, this graph indicates a slight decrease in the number of new farmers joining the project, over time. There are possibly two reasons for this, and the first is that the number of farmers in the Belas area who recognise the advantages of getting a loan to possibly increase production has peaked, meaning that most of the farmers in the community are already a part of the programme. The second reason, in conjunction with the first, is that Gestao de Cereais prefers doing business with recurring farmers, due to the extra costs and higher risks associated with first-time borrowers.

Figure 6-1 then illustrates the number of loans with commencement dates in a particular month (bottom graph), irrespective whether it is the first loan per farmer. The two graphs are therefore identical up to January 2019 due to these loans all being the first loans for farmers. The bottom graph does, however, show an increase in the number of new loans, over time, compared with the new farmers. This makes it evident that farmers who finished paying a loan do take up a subsequent loan, and this is therefore a strong indication that they find

benefits in making use of these loans to increase their productivity and production output (volume and/or quality).

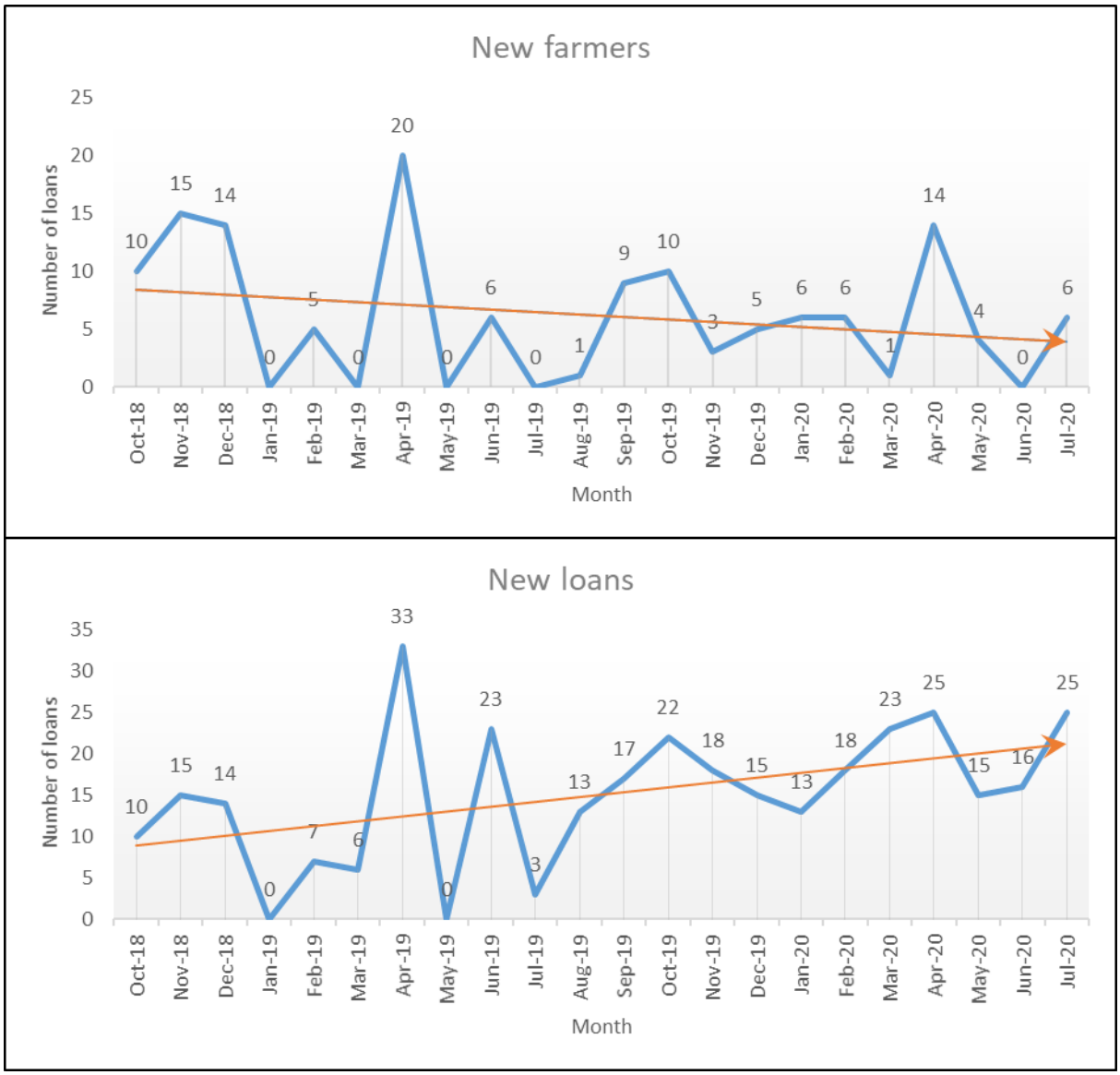

Figure 6-1: Top graph – Number of new farmers entering the project in Belas over time. Bottom graph – Number of new loans taken up in the project in Belas over time.

Source: Gestao de Cereais (2020)

The increase in the number of loans (157), over time, relative to the increase in the number of first-time loans (59), over time, as depicted in Figure 6-1, is 2.7:1 for the year 2019, and 3.6:1 (first-time loans = 37, new loans = 135) for the year 2020. This shows an increase in the number of farmers who take up further consecutive loans and is evidence that these farmers find value in the uptake of the loans.

Loan value

Analysing Figure 6-1 and Figure 6-2 in combination shows that the number of loans with a value between 0 and 19 999 metical taken in 2020 is substantially higher than that for loans taken in 2019 within the same value range. Upon further investigation, it is clear that 14 of these loans were taken for pesticides and insecticides to mitigate the amount of crop losses due to an infestation. Another large portion of these loans is made up of the first-time borrowers, and due to the higher risks and costs associated with first loans, Gestao de Cereais limits their exposure by giving only small loans to these farmers to enable them to build their credit record.

Analysing Figure 6-2, it is evident that the number of farmers taking up loans of more than 40 000 metical increased from a mere 7 loans in 2019 to 22 loans in 2020, and that all these loans are by farmers who are currently on at least their second loan with Gestao de Cereais.

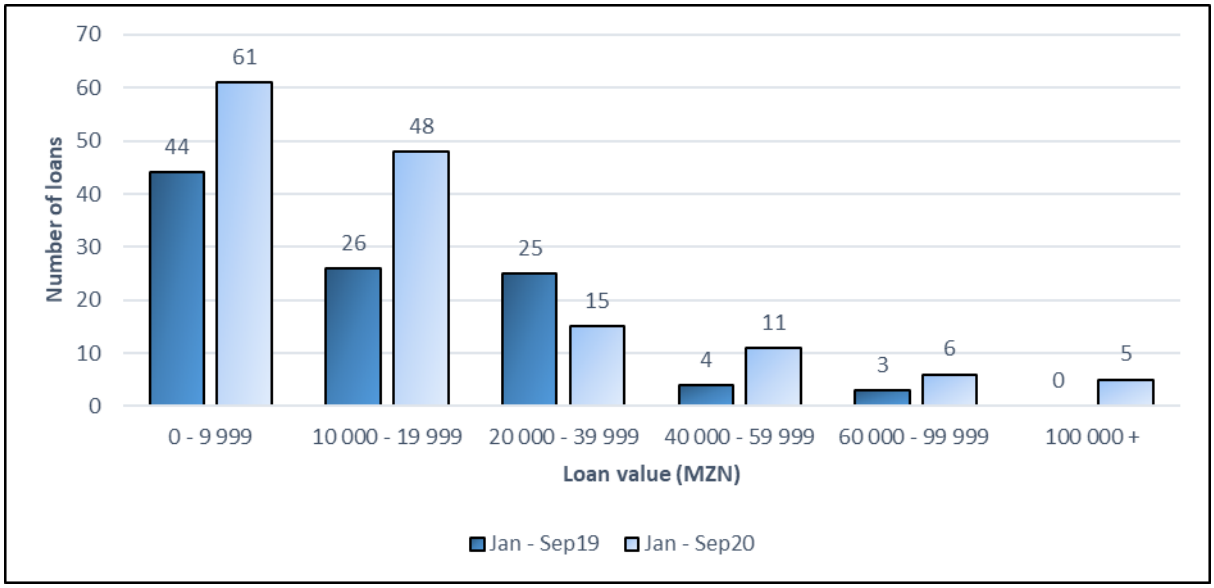

Figure 6-2: Number of loans within a value category for 2019 compared with 2020 (first 9 months of each year)

Source: Gestao de Cereais (2020)

Uptake of loans by gender

Figure 6-3 below shows the percentage distribution of loans taken up by men vs. women within the Gestao de Cereais programme in the right-hand side chart. The percentage split between loans taken up by men vs. women is 90:10. The percentage in favour of women may sound extremely small, but it equates to roughly the same percentage of women participating in the Gestao de Cereais project, as depicted in the left-hand side chart in Figure 6-3.

Only 15 of the total 142 farmers are women (10.6 percent), and the remaining 127 farmers are men (89.4 percent). This is despite the fact that Gestao de Cereais is conscientiously encouraging women to participate and to take up loans, as only a small percentage end up doing so. If the number of loans per participating female farmer is compared with that for men, it seems that there is no distinction between the genders, as the average numbers of loans per female farmer and per male farmer are 2.06 and 2.09 loans, respectively, (albeit from a low basis).

The data needs to be monitored for further investigation in the future in order to gain a more accurate estimate of the relationship between the uptake of loans by gender. The 10.0 percent of loans taken up by women can be seen as an overestimated value, because of the small sample size, which is in line with the study conducted by Rokhim et al. (2016), which stated that women are less likely to take up credit.

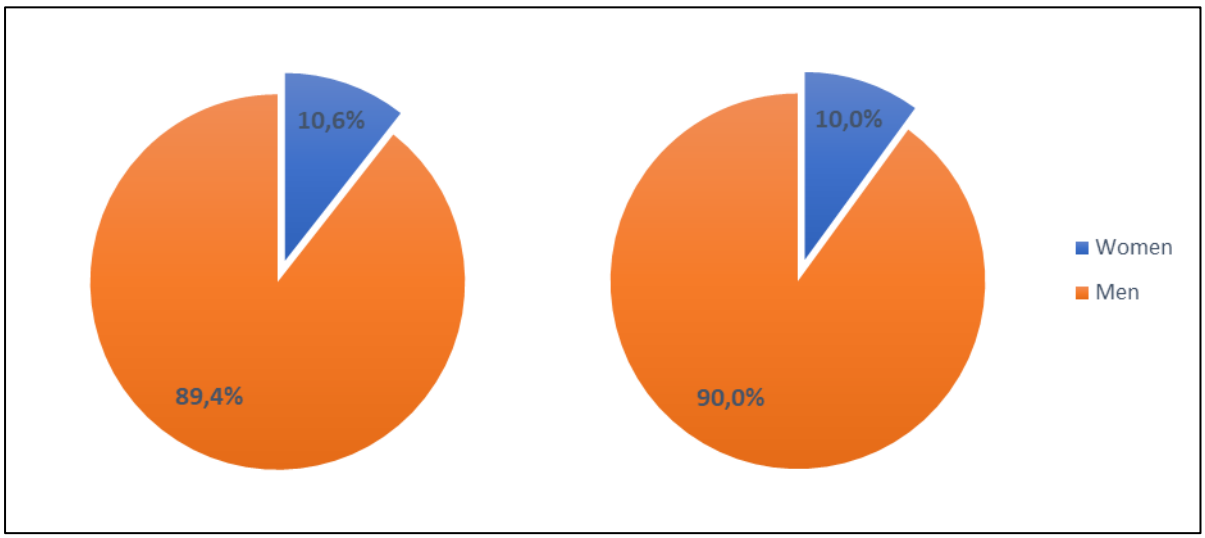

Figure 6-3: Left chart – Percentage of women/men taking part in the Gestao de Cereais project. Right chart – Percentage of loans taken up by men/women

Source: Gestao de Cereais (2020)

Uptake of loans by age

Figure 6-4 below shows the percentage distributions of farmers with only one loan, followed by those with two to four loans, and those with more than four loans, within different age groups. The first category (one loan) can largely be defined as comprising farmers (i) who are still busy paying their first loan, (ii) farmers who did not see the value in taking up a second loan, and (iii) farmers who were unable to repay their first loan and therefore did not qualify for a second loan. The farmers in the '2 – 4 loans' category can be seen as those farmers who

carry a lower risk because they already understand the loan and repayment process. These farmers have already started to build on their credit record and Gestao de Cereais has an indication of their repayment rates. The farmers who fall within this group are seen as being more credible and have a better repayment ability. Farmers who fall within the '5 – 11 loans' category are seen as 'superior clients', and only 14.6 percent of the farmers fall within this category. These farmers carry a lower risk of defaulting on their loans due to the training and experience they received through handling their first four loans.

Taking this into account, Figure 6-4 illustrates the point that, for farmers between the ages of 21 and 30, only half repaid their first loan, which is an indication that the farmers within this age group struggle to pay back their loans. Moving to the right of the figure, it is clear that the percentage of farmers who repaid their first loan increases up to the '41–50' age group, which is in line with the study done by Dorfleitner et al. (2017) that shows that the default rate is negatively correlated with age, and therefore older borrowers carry a lower risk of defaulting on their loan.

In the '41–50' age group, 73 percent of farmers were able to repay their first loan and continue to their subsequent loan, which is a clear indication that these farmers have a lower default rate, as compared with the other age group.

Upon further analysis of the graph, it is evident that the number of farmers still on their first loan gradually increases again for farmers over the age of 50, which is in contrast to the study done by Dorfleitner et al. (2017), but in line with the study done by Jumpah et al. (2018). The most logical explanation, according to Gestao de Cereais, is that farmers in this age bracket experience a decline in productivity due to the physical challenges associated with smallholder farming. The view is supported by Jumpah, Tetteh and Adams (2018). This study therefore make the conclusion that the default rate is negatively affected by the age of the farmer up to a certain point, after which the default rate will again increase.

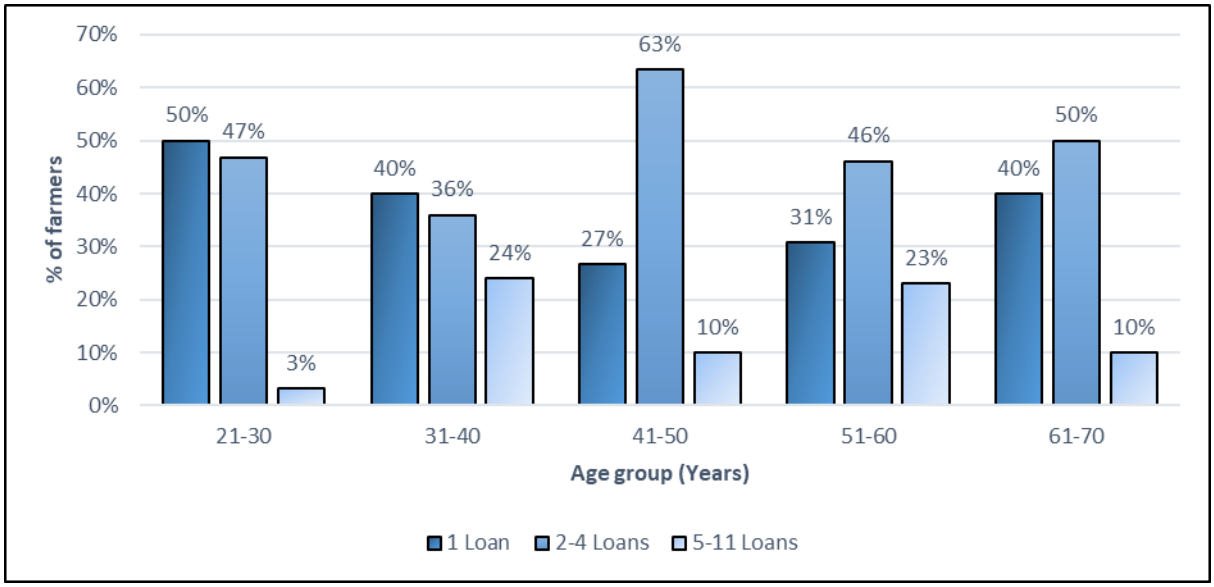

Figure 6-4: Number of loans taken by farmers in various age groups.
Source: Gestao de Cereais (2020)

Period between consecutive loans

We have previously stated that the continuous uptake of consecutive loans is a good indication of the need for loans by Belas smallholder farmers and that this shows that the farmers do attach a certain value to these loans (CHAPTER 7 'REPAYMENT AND COST OF CREDIT'). However, the ultimate indication of financial maturity is seen when a farmer does not automatically take up a subsequent loan immediately after he or she has harvested his or her crop and repaid the current loan. This indicates that the farmer was able to retain some of his or her income from the marketing of the crop, and might only need another loan, maybe a few weeks later. It is a sign of profitable production, income retention and growth.

Figure 6-5 below illustrates the number of months, on average, that a Belas farmer waited before taking up their next loan. It is noted that only 60 out of 114 (52.6 percent) of farmers took up a subsequent loan within one month. The balance of them, 56 out of 114 or 47.4 percent, only made use of a subsequent loan two or more months after repaying their previous loans. This shows that these farmers could cover their living expenses and some of the expenses required to start with their next production season, such as costs of seeds and labour.

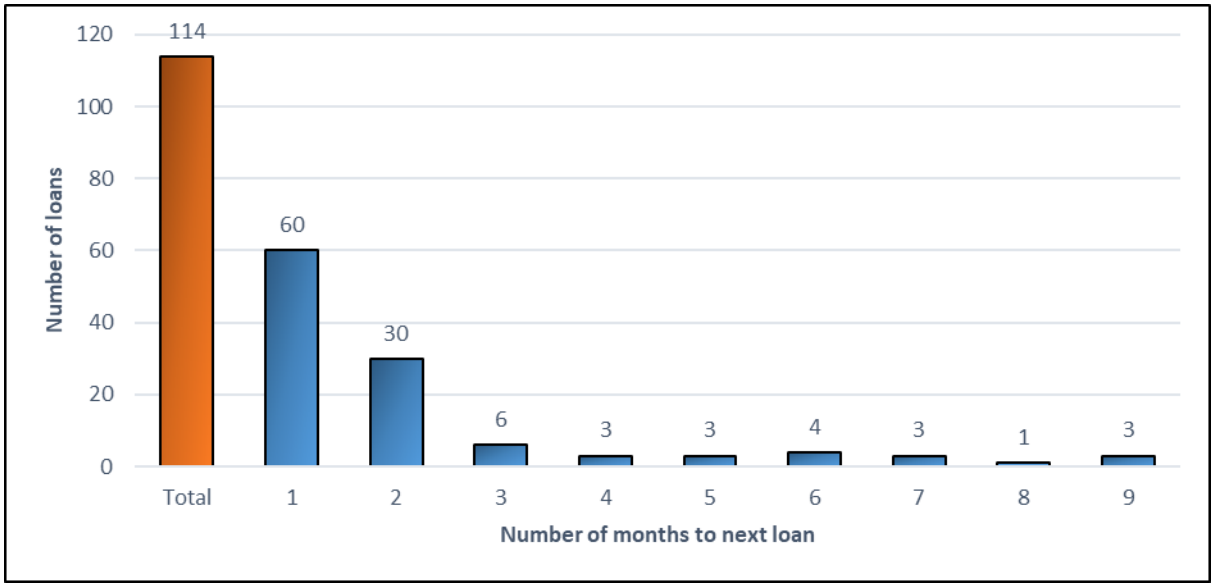

Figure 6-5: Number of farmers who took a new loan within a certain number of months after finishing their previous loan.

Source: Gestao de Cereais (2020)

Why would a farmer immediately take up a new loan? The downside is that all of his or her gross profit had to go towards servicing the loan, and now he or she is 'broke' again, which indicates a typical debt trap. However, it could also be that many farmers who now have access to credit immediately expand their production – this was evident, but difficult to prove statistically. Another reason is that farmers saved their surplus money (profits[8]) and took up new credit while it was available.

6.3 INCREASE IN PROCUREMENT OF INPUTS

6.3.1 Fertiliser and manure

Fertiliser and manure are seen as direct substitutes for one another by the farmers in the Belas community and are therefore used interchangeably by the farmers. Other than best value for money, availability and convenience, the cost of delivery also plays a role. Farmers are regarded as rational consumers of all inputs.

The bottom graph in Figure 6-6 shows the total value (in metical) of fertiliser and manure that was bought for specific harvesting seasons, over time. It is evident that the initial uptake of fertiliser was very high for the first harvest season, which was due to the product being made

[8] These higher profits would in most cases be due to the increase in production, as the prices of many crops planted by these farmers, for example, cabbage has a very volatile price and prices have decreased due to the market being negatively affected by the COVID-19 pandemic. The effect of the pandemic is only applicable in the data for the year 2020, and therefore the conclusion can still be made on data collected before 2020.

available at that time and so the initial uptake of the farmers for this product was very high. The uptake of fertiliser/manure then decreased, and then increased again. Gestao de Cereais at the time also had a policy to only fund farmers for direct inputs, like fertiliser from Omnia and Yara, and seeds from Starke Ayres, which were distributed by Gestao de Cereais as part of the project. The farmers would apply for a loan and disclose how many 50 kg bags they wanted, and Gestao de Cereais would then place a bulk order from one of the suppliers. They usually achieved a discounted price, and then distributed the products to the farmers, competitively and conveniently. Most importantly, this procedure is a way of ensuring that the funds are used for the appropriate inputs needed to improve production.

Figure 6-6: Value of fertiliser and manure bought by farmers over time.
Source: Gestao de Cereais (2020)

The top graph in Figure 6-6 shows the value (in metical) of the fertiliser and manure supplied, respectively. Because the farmers were only able to use fertilisers from Omnia or Yara, the amounts of manure purchased were minimal to none up to the '1 May to 31 Aug 2020' harvesting season. Gestao de Cereais then made the decision not to limit the farmers to loans for inputs paid directly to the supplier, but rather allowed them to take up cash loans, provided that the farmer disclosed what the loan would be used for. In the '1 May to 31 Aug 2020' harvesting season, there was a small change in the trend to substitute fertiliser with manure, and in the '1 Sep to 31 Dec 2020' harvesting season, a big shift can be recognised in respect to the substitution of fertiliser with manure.

After analysing the information, the conclusion is made that if farmers have the opportunity to rather take a cash loan and have more freedom regarding what the loan is used for, most farmers would substitute the fertiliser with manure. This shows that the farmers associate manure as being better value for money than commercial fertiliser. This is supported by the study conducted in Nigeria by Adekiya and Agbede (2009) that states that when manure is used as a stand-alone product, it adds more nutrients to the soil than commercial NPK fertiliser does when used as a stand-alone product. They also state that manure showed better growth results for the tomato crops planted (Adekiya and Agbede, 2009).

The bottom graphs plots the combined value of fertiliser and manure. The trend is as expected, although the dip in the period May to August could be attributed to the impact of the COVID-19 pandemic. It is expected that, going forward, an upward trend will resume.

6.3.2 Seed

Gestao de Cereais started distributing seeds to farmers for the harvesting period '1 May to 31 Aug 2019', and the focus was on a hybrid variety of cabbage seed that had to be imported from South Africa. Cabbage production dominates agricultural crops in Belas. Figure 6-7 illustrates the value of seeds sold over various harvesting seasons.

When the seed sales were first introduced, there was considerable interest in the new seeds that were being made available and large amounts of seeds were sold. The amount of seeds sold decreased in the next harvesting season, but then started to increase again, up to the '1 May to 31 Aug 2020' harvesting season.

Due to the recent COVID-19 pandemic regulations, the Gestao de Cereais was unable to continue their sales of cabbage seeds for the '1 Sep to 31 Dec 2020' harvesting season, and

that value is therefore excluded from the graph below. Seed sales have, however, increased significantly for the next harvesting season (1 Jan to 30 Apr 2021) (Input sales are captured based on the harvesting period, not the sales date, to coincide with the maturity date of the loans). This increase in the procurement of seeds is conclusive evidence that farmers are able to increase inputs, followed by an increase in their production output, by making use of the credit made available to them by Gestao de Cereais.

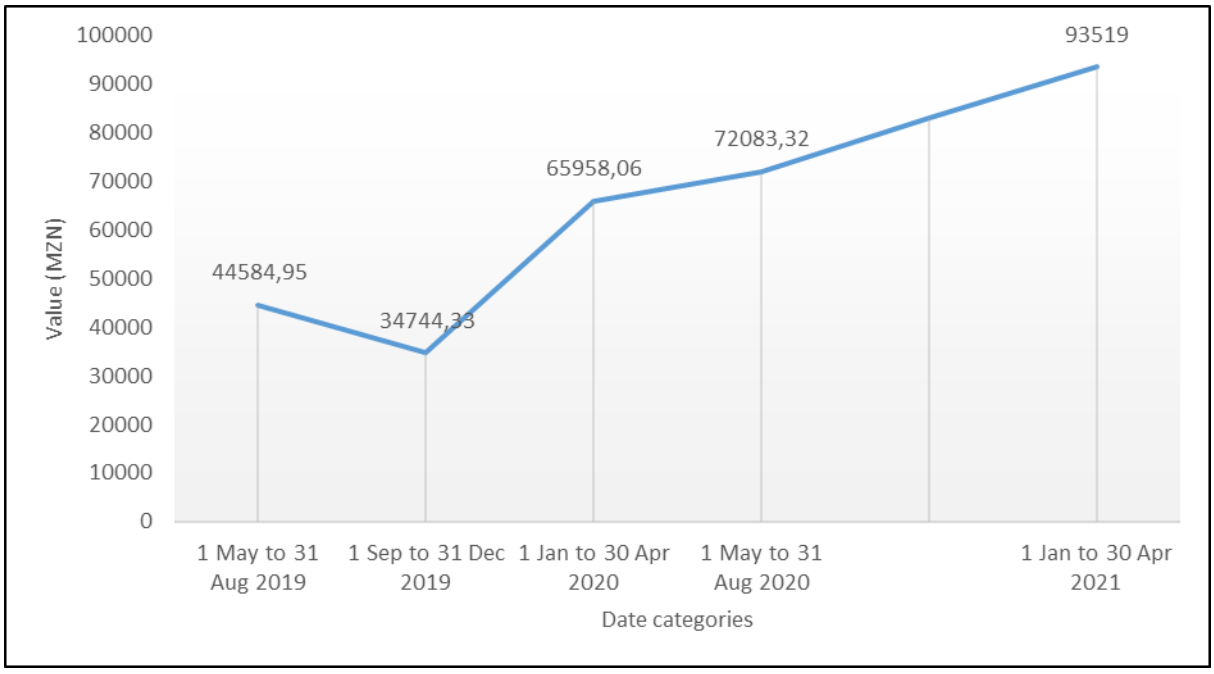

Figure 6-7: Value of seed that was sold by Gestao de Cereais, over time.
Source: Gestao de Cereais (2020)

6.3.3 Chemicals

Research conducted by George Rapsomanikis (2015) found that limitations in funds greatly limit the ability of smallholder farmers to make use of chemicals, leading these farmers to make use of extra labour. He also records that these practices require more reserves of skilled labour and better management skills and could significantly increase the farmers' costs in the long run, although a farmer might not feel the effects in the short run.

Gestao de Cereais recognised the importance and the benefits that chemicals could bring to the farmers in the Belas community and made a spraying programme available to the farmers. This was linked to the availability of credit that enabled them to buy the appropriate chemicals. The first 'chemical loans', as seen in Figure 6-8 below, represented by 'Herbicides and Pesticides', were made available for the '1 Sep to 31 Dec 2020' harvesting season. This was after some crops were lost due to an infestation, and therefore limited data is available

for analysis of the increase/decrease of the procurement of chemicals due to the availability of loans. With the data available it is known that 14 farmers purchased chemicals on credit, while none of them did so in the preceding production cycle.

Research has indicated (limited data) that, when offered the opportunity, farmers will purchase chemicals on credit. Ranked third after seed and fertiliser, farmers consider chemicals a “luxury” if cash flow is limited. However, in the production conditions of Belas with high temperatures and humidity, the use of chemicals is strongly advised. Many farmers have lost their crops due to funguses and insects, and if used, chemicals will ultimately result in more secure production and harvesting.

6.3.4 Labour

Labour is a very important aspect of any farming operation, and even more so for smallholder farmers who, due to the lack of mechanisation, need to employ more labour workers to increase productivity. Most of the labour used by the sample group of farmers in the Belas community is family labour and the associated costs are often ignored or underestimated in these farming operations. Making use of family labour does, however, limit the farmer with respect to the growth potential of the farming operation.

For a farmer to grow beyond a certain point, they would need to increase the labour used for the farming operation, but similar to the other input costs required for growth, these farmers do not have the cash to pay these additional labour workers.

We can see in Figure 6-8 that as soon as Gestao de Cereais allowed farmers to receive cash loans rather than only inputs paid directly to the supplier, the farmers allocated some of these funds to increase the labour component.

It is also worth mentioning that the higher demand for labour could also have a spillover effect on individuals of the community who are not part of the project. They might be hired as labour on these smallholder farms if the production increases, and/or the wage rate could increase due to the demand for labour increasing while the supply of labour stays constant. This statement is supported by a study done in Bangladesh by Khandker et al. (1998), which reported that while the wage increase is not large, it is significant for men in the region where microfinance is available.

6.3.5 Equipment

The farmers of the Belas community have limited access to equipment and rely primarily on contract labour to make a success of their farming operations. This is despite the irrigation network having been constructed and bringing water to their fields, but not necessarily reticulated within their fields. Farmers either have to dig channels to route the water or purchase pumps, pipes and sprayers to water their crops. There are some fields that run on gravity sprayers, but this is less than half and not necessarily adequate. (See also the previous explanation in CHAPTER 4 'THE BELAS IRRIGATION SCHEME'.)

Although only a relatively small value, Figure 6-8 illustrates that some farmers did use their loan to purchase, repair or upgrade their equipment, and this is depicted as 'irrigation equipment'. There is another category that is closely related to this, namely 'mechanical work" (the lease of a tractor with a plough and/or disc). Together with installing or upgrading their water supply, and having the confidence they will have sufficient water, the farmers clear or level new fields for production. Gestao de Cereais made loans available to the value of MZN 301,000 for mechanical work and MZN 290,500 for irrigation equipment. This would hardly have been possible for these farmers if they did not have access to credit.

An increase in the equipment used by these smallholder farmers, accompanied by the appropriate knowledge and/or training, could significantly increase the productivity of their farming operations and ultimately lead to growth in income and profit and improved livelihoods.

6.3.6 Land

Gestao de Cereais almost exclusively focuses on financing production inputs, followed by irrigation equipment and mechanical work. However, on an experimental basis, it has also financed three farmers to purchase land. There is not sufficient evidence to come to any conclusion, however, on the latter point. What is known is that, because of the land tenure system in effect, it is either impossible or very difficult to obtain a bond from a bank to purchase land.

6.3.7 Total input procurement

To remind us, the hypothesis states as follows: '*The availability of credit, the uptake thereof and the purchase of production inputs are positively correlated.'*

To test the hypothesis, all the inputs discussed up to this point is aggregated and now illustrate the combined value in Figure 6-8, below.

The top graph in this figure illustrates the aggregated value of the inputs, mechanical work and equipment purchases over the course of two years. It is evident that there is a definite increase in the value of procurement of inputs over the period.

The ‘1 Jan to 30 Apr 2019’ harvesting season shows a very high uptake of inputs, accompanied by a high uptake of credit, similar to what was depicted in Figure 6-1. This refers to the first loans and therefore reflects the input products that were made available to the farmers in the Belas community. The high uptake of credit, despite the limitation of credit only being available for input products bulk ordered from suppliers, indicates that these farmers have a need for this credit facility to acquire the appropriate input products.

A decrease in the value of inputs acquired can be seen in the second harvesting season, followed by a steady increase each consecutive season, up to the ‘1 May to 31 Aug 2020’ harvesting season. The decrease in the procurement of inputs, accompanied by the decline in the total loan values encountered during this time, could be due to the lagged economic response to the COVID-19 pandemic. This can, however, not be confirmed with the limited data available. A big spike in the value of the total inputs purchased at later stages is also observed. This could be due to the slight decrease in the previous season, causing more farmers to require loans for input products in this season.

As previously mentioned, Gestao de Cereais also started allowing farmers to take up cash loans at the end of the ‘1 May to 31 Aug 2020’ harvesting season, and this could also partly explain the surge in additional loans, and therefore increased procurement of inputs, in the ‘1 Sep to 31 Dec 2020’ harvesting season.

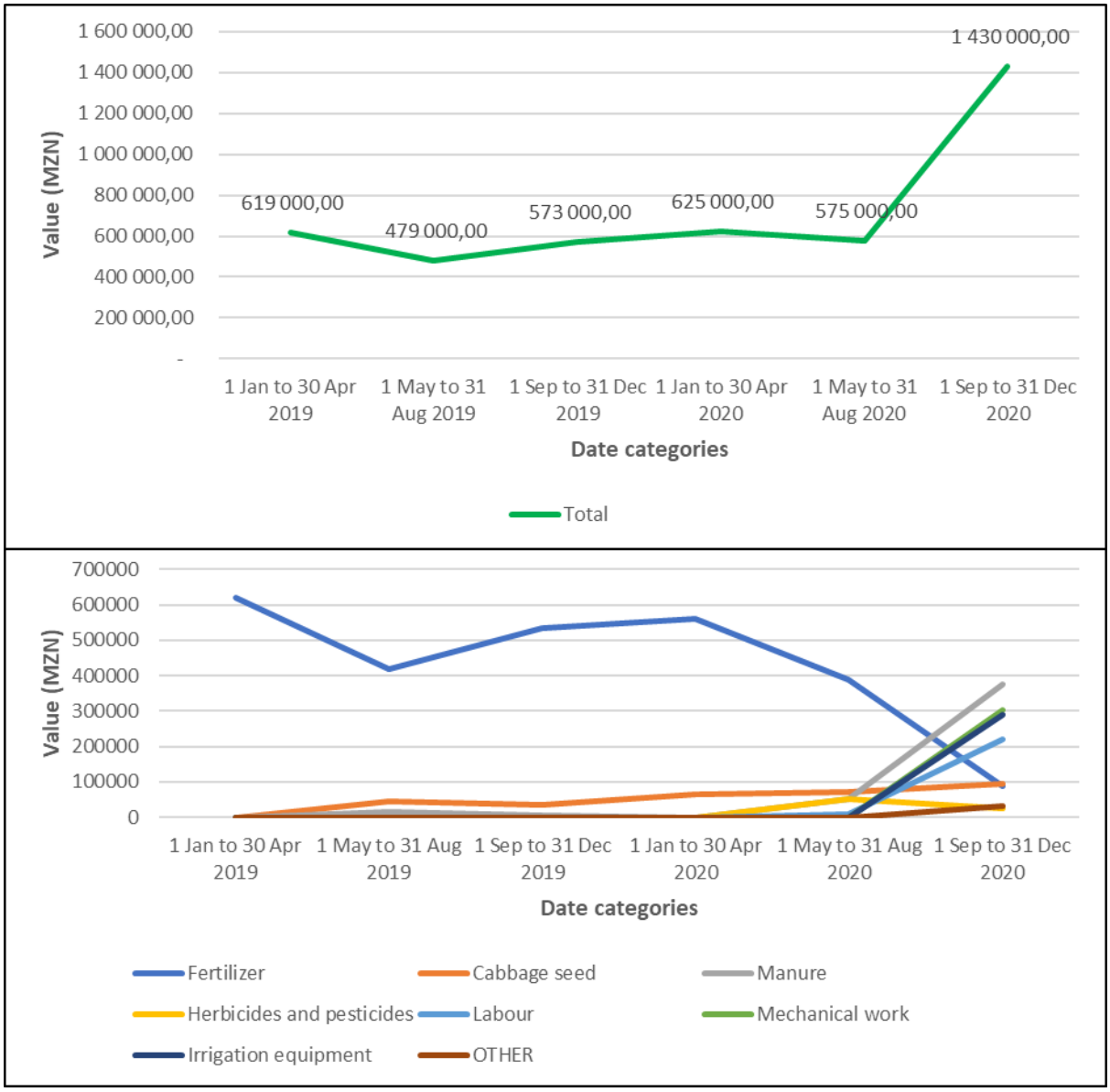

Figure 6-8: Top graph – total procurement of inputs over time. Bottom graph – Breakdown of procurement of inputs, over time

Source: Gestao de Cereais (2020)

The bottom graph in Figure 6-8, illustrates the breakdown of the various components that compile the top graph.

Of the products listed, fertiliser, cabbage seed, and herbicides and pesticides were paid for by Gestao de Cereais directly to the supplier to ensure that the farmers used the loans specifically to acquire inputs to enhance their production capabilities. This explains the gap between the fertiliser and the rest of the input products throughout the first harvesting seasons. Although seeds were also made available on credit, seeds only make up a small portion of the expenses to these smallholder farmers.

It is evident that as soon as Gestao de Cereais altered their policy to allow farmers to apply for and receive cash loans at the end of the '1 May to 31 Aug 2020' harvesting season, farmers reduced the amount of fertiliser acquired and substituted this with manure (as mentioned in 6.3.1 'Fertiliser and manure'). Although the increase in manure represents the highest increase, it is observed that farmers also used a large portion of loans towards mechanical work, labour, and irrigation equipment.

Analysing Figure 6-1 and Figure 6-8 together, it is evident that with the increase in the number and value of loans taken up by smallholder farmers, an increase in the procurement of inputs can be seen over time. The question remaining is, will the availability and use of credit for inputs be enough to increase the production capabilities of these farmers? What about training and/or extension – is that not also a prerequisite?

In a 2017 journal article by Haider, Asad, Fatima and Zain Ul Abidin titled 'Microfinance and Performance of Micro and Small Enterprises; Does Training have an Impact', the authors reported that owners of MSEs (micro and small enterprises) who received training had a better success rate with income, sales, assets and the number of employees. The article concludes that training does have a significant impact on the performance of an MSE (Haider et al., 2017).

CHAPTER 7 REPAYMENT AND COST OF CREDIT

7.1 INTRODUCTION

Gestao de Cereais believes that a secondary consequence of a farmer not repaying his or her loan, or even paying it late, is that it sets a bad example for other farmers. Such farmer should not qualify for another loan, harsh as this may sound. Sometimes, though, training could make a difference, particularly in advance of loans being granted. Gestao de Cereais does train farmers in advance and has credit officers continuously monitoring performance (production, harvesting and sales) to ensure or increase the likelihood of loan repayments.

In a study conducted by Giné and Karlan (2014), it is stated that there is no significant difference in the default rate when comparing the farmers who have a group loan versus that for individual loans. The experience of Gestao de Cereais in Belas differs from this. However, the concept needs to be better analysed since poorly performing farmers do not qualify for follow-up loans, while in a group they might continue to be included for further loans.

It is also important to analyse the repayment and default rates of the farmers, because the continuous growth of the MFI and farmer with respect to the number and size of loans is subject to the repayment of their first loan to enable them to take up a subsequent loan, which will most probably be of a higher value to the previous loan.

As stated in section 2.4.3 ’Repayment and cost of microcredit’, Emmanuel et al. (2018) state in their study that the key determinants for repayments of micro-credit loans are:

- Age
- Gender
- Interest rate
- Dependants
- Loan value
- Repayment duration

7.2 REPAYMENT OF CREDIT

The main objective of this research is to prove that there is a demand for credit amongst smallholder farmers. If offered the opportunity, the majority of them will use it. Needless to

say, repeated uptakes of loans would depend on the repayment of the previous loan. The two are inseparably linked to each other. No financier will continue to offer credit to a farmer or group of farmers if they do not repay their loan(s). This section will analyse the repayment of loans.

Throughout this section, the average number of months during which farmers paid their loans late[9] will be used as an indication of the repayment ability and the repayment rate of farmers, as well as the number of consecutive loans taken up by farmers. It is assumed that farmers had to repay their current loan before qualifying for another loan.

Repayment rate and financial inclusion

Referring back to section 4.3.8 'Financial inclusion', the study wanted to evaluate whether being financially included has any effect on the repayment rate of a farmer. In other words, if a farmer has a bank account or mobile wallet, will he or she then act more responsibly and repay his or her loan on time, or at least faster than those farmers who do not have bank accounts or mobile wallets? The results analysed and depicted in Figure 7-1 show that farmers who are financially included[10] repaid their loan 1.98 months late, on average, compared with 2.71 months late, on average, for farmers who are not financially included. It should be noted that farmers who are part of the Gestao de Cereais project are encouraged to open a bank account and/or a mobile wallet account, although it is not a requirement. Gestao de Cereais are more in favour of mobile wallets due to the low costs and ease of use. This is particular true for smaller loans, say up to around MZN 25,000, given certain transactional restrictions that still apply in respect of mobile wallets.

9 Unfortunately, it is a fact that many farmers repay their loan late but do still pay. The norm would be to measure how many farmers pay on time. However, the study also measures how many months "late" the farmer pays, and if the period becomes shorter over time, it is a positive sign.

10 Has access to either a bank account or mobile wallet.

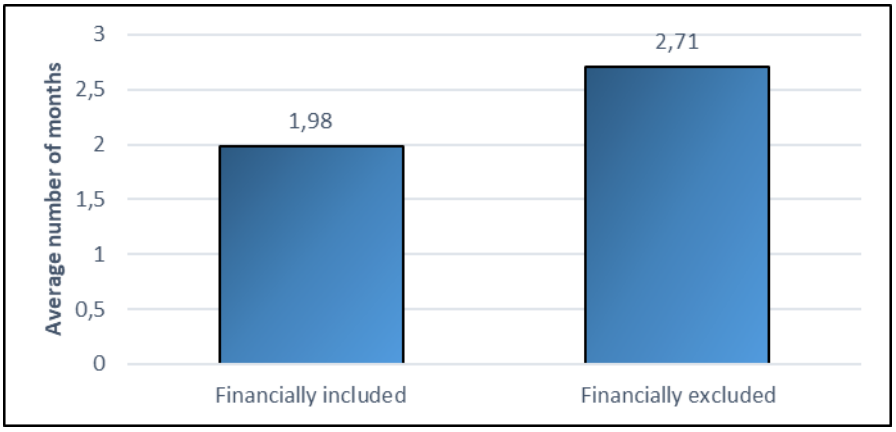

Figure 7-1: Average number of months farmers repay their loans after the due date: Financially included vs. excluded.

Source: Gestao de Cereais (2020)

Based on the data analysed in Figure 7-1, it is deduced that farmers who are financially included are considered to be better clients. However, it is suspected that the more innovative farmer is the same farmer who initially opened a bank account or subscribed to a mobile wallet. They are usually the ones who see the benefits of these services and will also recognise the benefits of credit, if it applies to their circumstances.

Uptake of consecutive loans

It is expected that the more consecutive loans a farmer has taken up, especially after a certain threshold, the higher the chances are that they recognise the value of credit, and the more likely they are to continue to take advantage of the availability of credit. This statement is supported by the study done by Kocenda and Vojtek (2009), which states that the length of the relationship between a borrower and financial institution has an inverse relationship on the probability of default. In this study, farmers with more than three loans (the perceived threshold) are seen as well-established clients who are thought to be familiar with the requirements and process of applying and repaying their loans.

Data in this regard was subsequently analysed and the results are depicted in Figure 7-2. The graph confirms the abovementioned view and illustrates details of farmers who took up consecutive loans.

The first loan had to be taken up within the period from October 2018 to December 2019[11]. Although only 69 percent of farmers who received a first loan moved on to get a second loan, the percentage does not tell the full story. Gestao de Cereais are not necessarily pursuing a

11 Farmers who commence with their first loan after December 2019 were excluded since they have not yet had the opportunity to take up consecutive loans.

higher number since they recognise that the first loans for farmers are considered very high risk and, *inter alia*, limit the size of the loan to mitigate their risk. They endeavour to retain only the low-risk, responsible clients. Of the 31 percent who do not "immediately" take up a second loan, some do not qualify since they did not repay the loan, while others (who do qualify) sometimes come back much later, which in this case fell outside of the time frame of the graph. The availability and quality of training, especially for the first loan but also thereafter, always play a role. The same could be said about leading farmers in the community who could serve as role models – in this case, when it comes to the uptake and repayment of loans.

The graph illustrates a continuous increase in the percentage of farmers who take up a consecutive loan, showing that when a farmer has already repaid his or her loan, they find increased advantages and value in the loan. The dotted line in this graph represents extrapolated data and shows an accurate estimate of the percentage of farmers who would take up their fourth loan. The data is extrapolated because most farmers have not yet had the opportunity to take up their fourth loan. The average contract length for these farmers is four months, which means that a farmer can have no more than 3 loans per year. This implies that all farmers who took up their first loan after 01 October 2019 will automatically not be able to have yet applied for their fourth loan.

When the data is not extrapolated, it is seen that only 51 percent of farmers moved on to their fourth loan. Upon further investigation, it is evident that the low percentage of farmers who moved to their fourth loan is due to the 47 percent of the farmers who are on their third loan and have not yet repaid their loan.

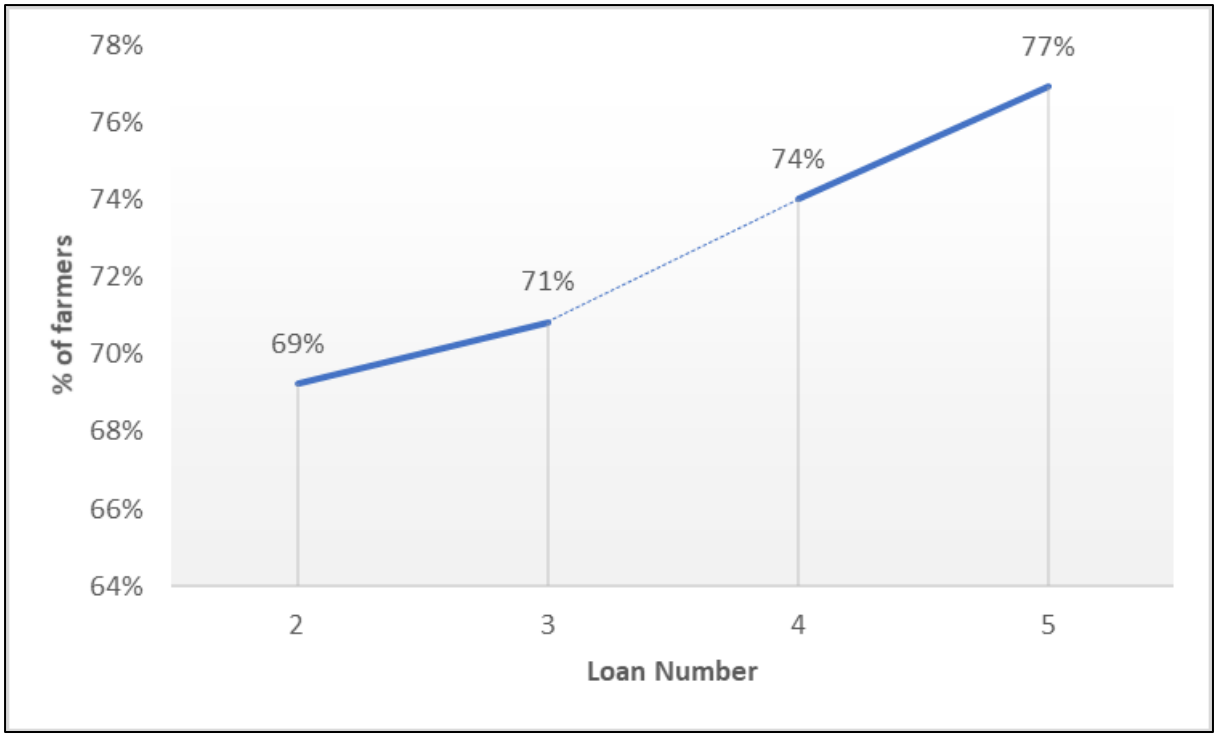

Figure 7-2: Percentage of farmers who take up a consecutive loan (1st loans with commencement dates from October 2018 to December 2019)

Source: Gestao de Cereais (2020).

Interpretation, Figure 7-2: 69 percent of farmers who was awarded a first-time loan then qualified and took up a second loan. Of those, 71 percent took up a third loan, etc.

Yearly repayment rates

There is a view in the microfinance industry that, when establishing a longer-term relationship with a farmer and he or she takes up further loans, their repayment rate strengthens as well as the risk of default. The study analysed this data as it applies to the Gestao de Cereais project and the results are depicted in Figure 7-2 and Figure 7-3. This first graph illustrates the numbers of farmers who paid their loans early (indicated by a negative sign), on time ("0"), and late (all positive numbers). Applicable data was separated for loans that were due and repaid in the years 2019 and 2020. For loans that were due in the year 2019, 35 percent of the 116 repaid loans were repaid within the contract date, while 54 percent of the 110 loans due and repaid before 30 September 2020 were repaid within the contract date. This shows a significant increase in the repayment rate of farmers. There are several reasons for this, including:

- more farmers in 2020 would be on their second, third, etc., loans than in 2019, meaning better repayment rates,

- Gestao de Cereais was more cautious in giving new farmers large loans,
- Continuous training, and
- Access to more and better inputs, resulting in improved crop production.

What is also noticed from the graph, for the year 2020, is that a further 25 percent of these loans were repaid within only a month of the contract date. This could be seen as being beneficial to Gestao de Cereais, as they would receive interest on the loans at a higher rate when they become overdue, making their returns on the loans higher than expected. However, it should be kept in mind that overdue loans increase the risk of default, and therefore the longer a farmer is behind on payments, the higher is the risk carried by the MFI of default on the loan. No doubt, the first prize is always for the client to pay the loan on time.

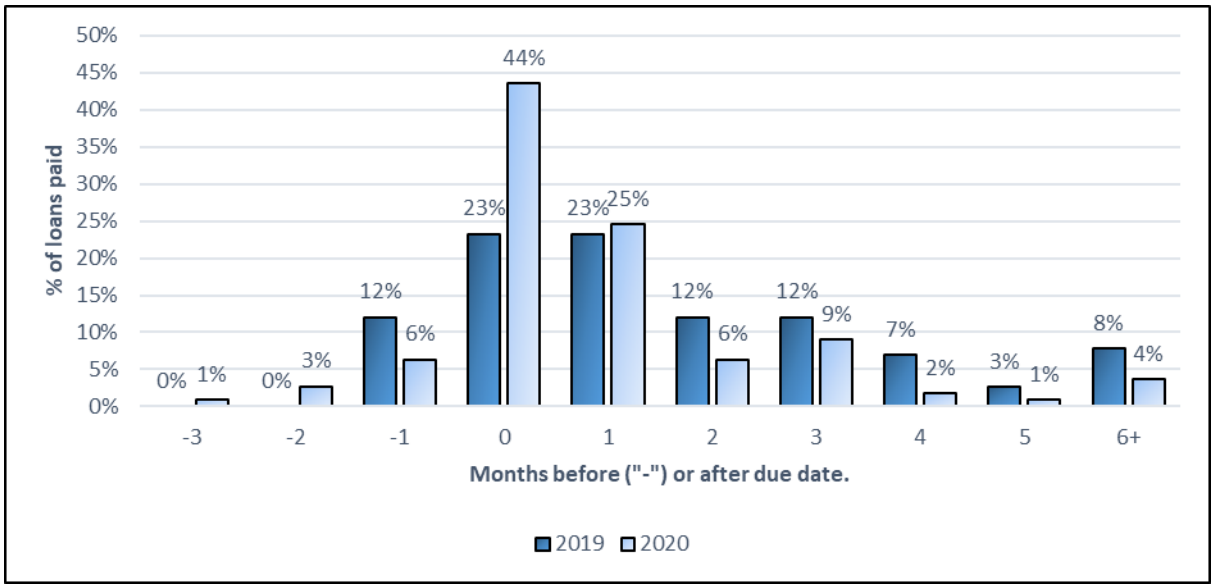

Figure 7-3: Percentage of farmers who paid their loans early/late.
Source: Gestao de Cereais (2020)

Repayment of loans: Men versus women

When analysing the repayment rate of women versus men, it has to be taken into consideration the constraint discussed in Section 4.3.8 ‘Financial inclusion’, that only 15 women form part of the Gestao de Cereais project, despite the encouragement given to women to take part.

However, the analysed data depicted in Figure 7-4 gives a reasonable indication of the repayment rates of women versus men within this community. It is observed that a slightly

larger percentage of women repay their loans early/on time, and a larger percentage of women repay their loan within only 2 months after the due date of the loan.

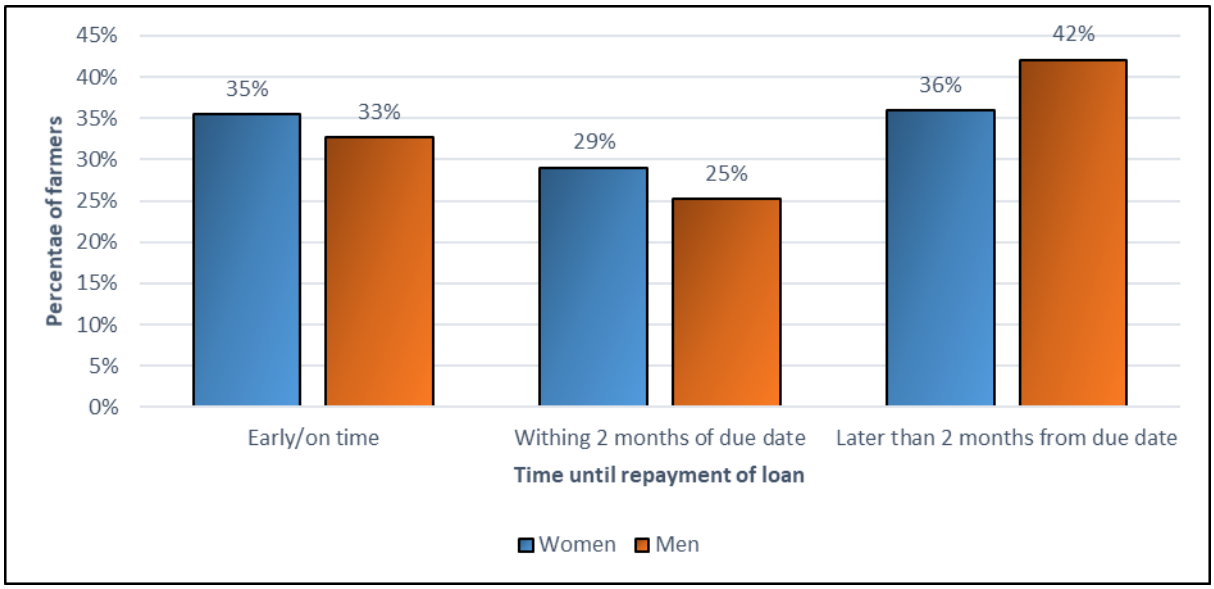

Figure 7-4: Payment rates of men and women
Source: Gestao de Cereais (2020)

Repayment period after due date by number of loans taken up

Farmers who have successfully repaid their loans and then took up another loan can be seen as a better investment for Gestao de Cereais, which is due to the farmer already understanding the loan process. This is shown in Figure 7-5 where steady decrease in the average number of months that farmers took to repay their loans is seen, after the due date has past, and before they would qualify/take up a subsequent loan. This trend continues up to the sixth loan, where the average farmer repaid their loan before the initial due date. The extreme spike in the average number of months applicable to farmers with seven loans will be further discussed below, by making use of Figure 7-6.

It should, however, be noted that the data used in this graph is limited to loans that have been successfully repaid and does therefore not include any data on loans that have not yet been repaid.

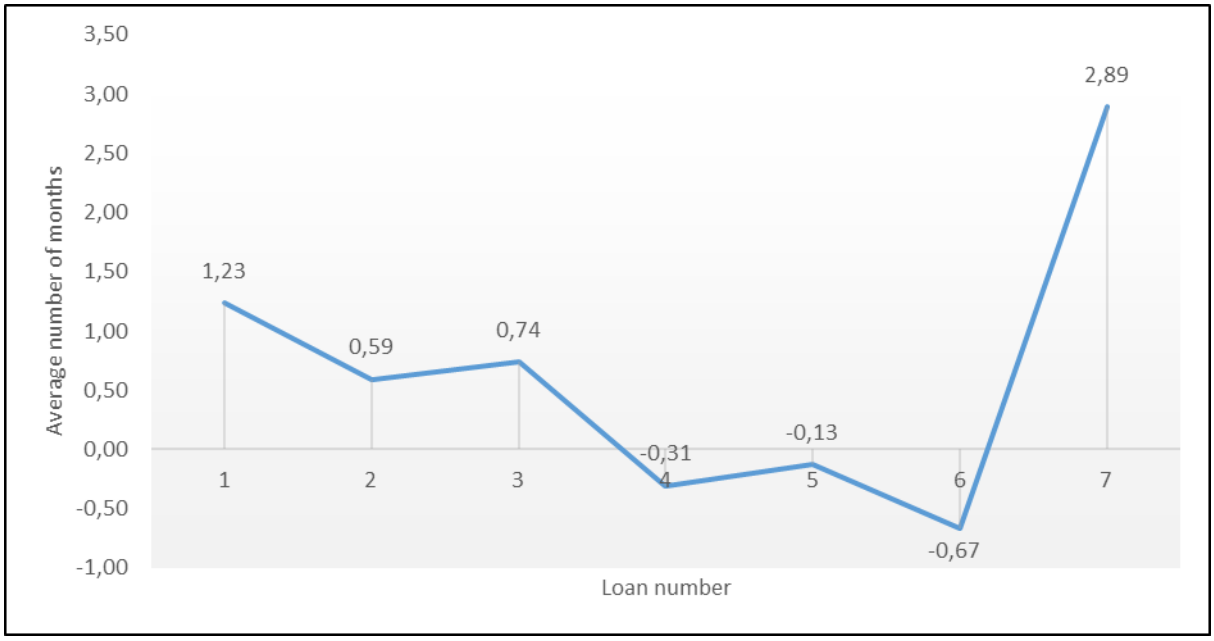

Figure 7-5: Average number of months it takes farmers to pay their loan, by number of loans taken up.

Source: Gestao de Cereais (2020)

When does the loan size get too big for a farmer and his circumstances?

Farmers who take up consecutive loans, as discussed earlier in this section, tend to increase their loan size with each consecutive loan. This is as expected and could lead to an increase in income and overall profits for the farmers. But, does this affect the repayment ability of the farmers?

Figure 7-6 illustrates the average number of months that the farmers paid late within the respective loan value categories. The gradual decrease from the '0 – 9,999 mt' to the '60,000 – 99,999 mt' categories can be explained by evaluating both Figure 7-5 and Figure 7-6. Although the cumulative size of the first categories of loans is small, a better repayment rate for these loans are expected, a large portion of these loans are first-time, high-risk loans for farmers. This means that the slow repayment rate is explained by the fact that the first-time farmers had not yet received "training" with respect to the loans, and these farmers were not familiar with the process.

In contrast, as farmers take up further and bigger value loans, they became not only more familiar with the process, but also develop a better understanding of the value of credit. Some wish to build a good credit record or maintain it. It is noticed that there is an exception to the downward trend, but believe this is related to the statistical sample and will be monitored in the future.

All the above is true until the threshold level is exceeded. Loans with values exceeding 100,000 metical show an extreme spike with respect to late payments, which is unexpected because these farmers have already received at least four loans, which have been repaid successfully.

Only five loans were approved for more than 100,000 metical, and the recipient farmers have all had problems with repaying their loans. Of these loans, the first was taken on 25 November 2019, and the last loan was taken on 28 January 2020. It is hard to identify exactly what has caused these farmers to default on their loans, but it is clear that each of these farmers had to be screened and their production plans needed to be analysed to ensure each farmer's repayment capability. This is in line with the study by Adu, Owualah and Babajide (2019), which states that the probability of defaulting increases as the size of the loan increases.

One effect of the COVID-19 pandemic, being a halving in the price of produce because of a downturn in economic activity, has undoubtedly had an impact on the repayment of these farmers' loans[12].

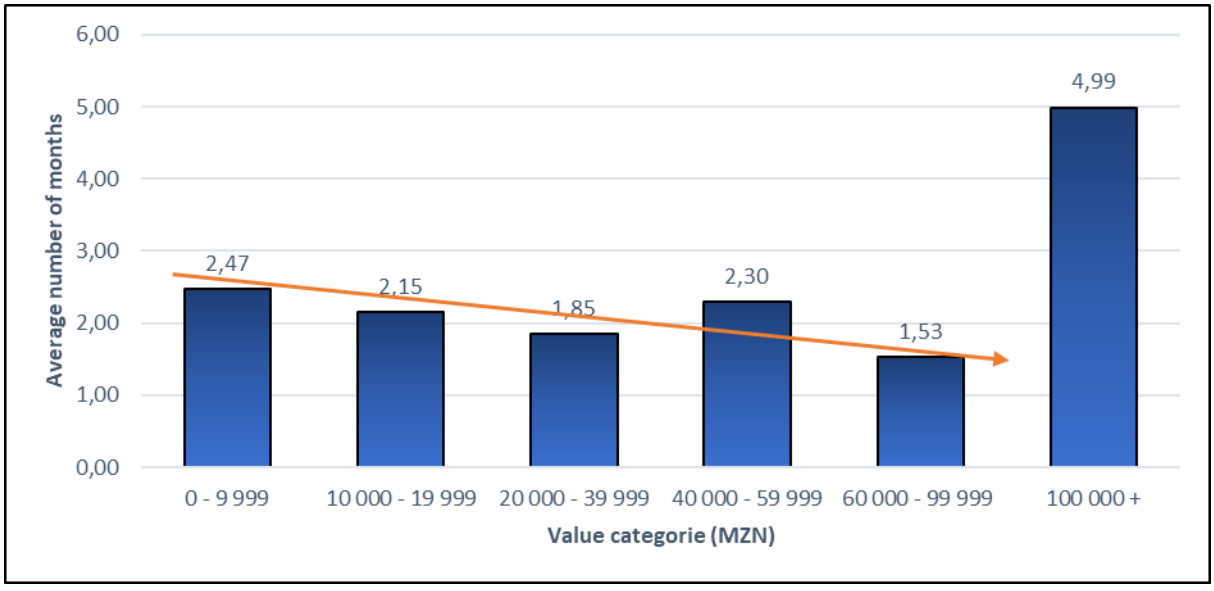

Figure 7-6: Average number of months farmers pay late within a value category.
Source: Gestao de Cereais (2020)

[12] The negative effect of the COVID-19 pandemic could not be precisely quantified at the stage of writing this research paper, but Gestao de Cereais definitely experienced some decrease with respect to repayments, this could be attributed by more than just the decrease in the prices of the products. The farmers could have undergone higher health costs or other unforeseen costs like funerals, which could cause them to delay their repayments.

7.3 MULTIPLE REGRESSION MODEL

A multiple regression model is presented to determine whether age, length of the relationship and loan size have significant effects on the repayment ability of a farmer on his or her loan.

The model is expressed as:

Equation 1: General equation for multiple regression.

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + u$$

Where:

y: Dependant variable (Repayment rate, estimated as the number of days paid early/late) (RepRt).

B0: Intercept

B1: Parameter of x1

x1: First independent variable (Age)

B2: Parameter of x2

x2: Second independent variable (length of relationship, estimated by the number of loans the farmer has) (LoNr)

B3: Parameter of x3

x3: Third independent variable (Loan size) (LoSz)

u: Error term

Therefore:

Equation 2: Equation to be used for the multiple regression.

$$RepRt = \beta_0 + \beta_{Age} Age + \beta_{LoNr} LoNr + \beta_{LoSz} LoSz + u$$

- In line with the literature review and other graphs the following signs are expected for the different parameters:

- Age: As the age increases, a decrease in the number of months paid late is expected, therefore a negative relationship is expected.
- Relationship length: The longer the relationship between the borrower and the financier, the faster the borrower is expected to pay therefore, a negative relationship is expected.
- Loan size: As the loan size increases, *ceteris paribus*, the borrower is expected to pay his loan later than he would have for a smaller loan value, therefore the relationship is expected to be positive.

The results of the regression follows:

```
Call:
lm(formula = RepRt ~ Age + LoNr + LoSz, data = R_Script)

Residuals:
    Min      1Q  Median      3Q     Max
-137.83  -61.86  -22.05   39.28  498.44

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  9.018e+01  2.129e+01   4.235 3.09e-05 ***
Age         -3.714e-02  4.654e-01  -0.080  0.93645
LoNr        -1.138e+01  2.171e+00  -5.243 3.10e-07 ***
LoSz         6.955e-04  2.507e-04   2.775  0.00589 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 91.57 on 283 degrees of freedom
Multiple R-squared:  0.09304,   Adjusted R-squared:  0.08342
F-statistic: 9.677 on 3 and 283 DF,  p-value: 4.231e-06
```

Figure 7-7: "R" printout of the results for the multiple regression.

This will then reflect in the formula as follow:

Equation 3: Regression equation for the analysis of the variables.

$$RepRt = 90.18 - 3.714 * 10^{-2} Age - 11.38 LoNr + 6.955 * 10^{-4} LoSz$$

The parameters are all in line with what was expected.

Both the length of the relationship between the financier and the borrower and the loan size is found to be significant variables at a 10% level of confidence, while age is found not to be statistically significant.

The adjusted R-square value of 0.083 is very low, and means that only 8.3% of the variation in the repayment rate is being explained by the independent variables, in accordance to the literature, this is an indication that there are some significant variables that are not being taken into account in this regression model, further studies are needed to fully evaluate the regression model.

7.4 COST OF CREDIT

High costs are always associated with microcredit, and as explained in Section 2.4.3 'Repayment and cost of microcredit', this can be justified by the high costs associated with managing and maintaining these loans. The cost of transactions is very high for micro loans, due to the loans being small in size.

Table 7-1 shows the cost structure that is followed by Gestao de Cereais for the loans made available to the Belas farmers who are part of the project.

Gestao de Cereais started out with only writing loans at an interest rate of 4.5 percent per month, simple interest, and added an administrative fee of only 1 percent of the total value of the loan. When a farmer defaulted on the loan, Gestao de Cereais increased the interest rate to 5.5 percent monthly, simple interest. This cost structure was followed to the end of April 2020.

Table 7-1: Costs associated with loans at Gestao de Cereais

<table>
<tr><th>Date</th><th>Interest rate</th><th>Administrative costs</th><th>Cash transfer fee</th></tr>
<tr><td rowspan="2">Oct18 - Apr20</td><td>Simple monthly interest @ 4,5% per month (Up to due date)</td><td rowspan="2">1% of total loan value, but with a minimum value of MZN300</td><td rowspan="2">2% of the value that needs to be given to the farmer in cash/transferred to his/her account.</td></tr>
<tr><td>compunded interest @ 5,5% per month (When due date has passed)</td></tr>
<tr><td rowspan="6">May20 - Oct20</td><td rowspan="3">Daily calculated and Monthly compounded interest @ 4,5% per month (Up to due date)</td><td>0 - 9 999 = MZN 500</td><td rowspan="6">2% of the value that needs to be given to the farmer in cash/transferred to his/her account.</td></tr>
<tr><td>10 000 - 19 999 = MZN 750</td></tr>
<tr><td>20 000 - 39 999 = MZN 1000</td></tr>
<tr><td rowspan="3">Daily calculated and Monthly compounded interest @ 5,5% per month (When due date has passed)</td><td>40 000 - 79 999 = MZN 1500</td></tr>
<tr><td>80 000 - 99 999 = MZN 2000</td></tr>
<tr><td>More than 100 000; 2% of the total loan amount.</td></tr>
</table>

Source: Gestao de Cereais (2020)

Gestao de Cereais found that the costs associated with the loans were higher than anticipated and updated their cost structure, as can be seen in Table 7-1. Gestao de Cereais did not increase the interest rates associated with the loans, but rather changed the calculation method to a daily calculated and monthly compounded calculation. They also changed the administrative fees associated with the loans to a sliding scale because the costs associated with giving and managing a small loan are not linearly lower, but rather only marginally so.

Gestao de Cereais justifies the increase in administrative costs on the basis that these are the costs that needed to cover the salaries of the field officers who are responsible for the collection of the loan payments.

This is in line with the study by Adu et al. (2019), which states that there is no significant effect on the probability of a farmer to default, as farmers did not change their behaviour due to an increase in fees and change in loan structure.

Revisiting Figure 6-1, in light of the above mentioned, it is evident that the farmers continue to take up new loans, despite the perceived high costs associated with the loans.

We can therefore say that the perceptions of high costs of these loans are wrong, when comparing the costs with the demand and uptake of the microcredit.

CHAPTER 8 CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

Smallholder farmers in many countries around the world have virtually no access to formal credit (Saqib et al., 2016; Matusse and Assane, 2020). This also applies to Mozambique. Some institutions do offer credit but require the farmer to present collateral against the facility, which is something that the farmer rarely has, or has insufficient collateral to qualify for a credit facility. Therefore, that farmer effectively has no access to credit. The 'availability of credit' should always be seen in the context of how easy (or difficult) it is for a smallholder farmer to qualify for the credit. In the case of the Gestao de Cereais project, unsecured credit is offered to the Belas farmers. This therefore presents the ideal circumstances to analyse the demand for uptake and the effects thereof.

The objective of this dissertation was to determine whether there is a demand for credit amongst smallholder farmers, and whether the uptake of credit would result in an increased use of inputs. Against this background and the analysis done in CHAPTER 6 and CHAPTER 7, the following conclusions could be made:

(i) From the moment it became known in the community that credit was available, the number of farmers taking up loans over the survey period increased sharply, especially in the first several months. The number of new farmers taking up loans decreased over time, but the total number of loans has increased continuously, as represented in Figure 6-1.

(ii) Having taken one loan and repaid that loan, the farmers in 69 percent of cases would continue to then take a second loan, and of those farmers, a further 71 percent again continued to their third loan, etc. It can thus be concluded that the farmers who repaid their first loan have seen the value of the loan offered to them and recognise that the availability of credit (cash) to the farmer could help them to increase their productivity, income and profitability.

(iii) The bulk of the loans is used to procure inputs. As the farmers qualify for larger loan amounts, they also start using the loan towards acquiring mechanical works and investment in irrigation equipment. This shows that a farmer has the ability to expand the business operation, when he or she has access to credit facilities.

(iv) Although most of the labour used on these smallholder farms comprises family labour, the study found that when the farmers have the opportunity to take up a cash loan instead of a direct input loan, they will make use of this opportunity and often start using labour.

The above-mentioned points confirm the first hypothesis: '*The availability of credit, the uptake thereof and the purchase of production inputs are positively correlated.'*

There is also a perception that if and when credit is available, it is excessively expensive and it is of little help to the farmer. This is a complex topic and considerable amounts of data for analysis are required to determine the point at which the cost of credit is too expensive, resulting in a farmer declining to take up the credit available. However, the contrary is equally true, and as long as farmers are still taking up credit, they do consider the credit to be worthwhile. This view is supported in Section 7.4 'Cost of credit', and when analysed in combination with the findings in CHAPTER 6 and CHAPTER 7, it is evident that the costs associated with the microcredit is justified, and the farmers can profitably make use of the credit. It must be stressed that each product and production area are different, and also that differences arise, depending on whether the product is grown under irrigation or rain-fed conditions. Tree crops are also different.

The fact that farmers continuously took up credit and, after repaying their credit, applied for a consecutive loan confirms the second hypothesis: '*The perceived high cost of credit is incorrect when compared against the strong demand and uptake of available credit.'*

Furthermore, it was found that there is no real difference between the uptake of credit between men and women. Evidence also shows that older farmers have a tendency to take up more loans than the younger farmers do, supporting the assumption that older farmers have a better understanding of the value of credit.

Some 47.4 percent of farmers did not experience the need to take up a consecutive loan, directly after repaying the preceding loan. This probably (and hopefully) means that these farmers made enough profit to continue with their daily lives, as well as to start preparations for the next production season. For the balance of farmers (62.6 percent) who took up a loan within a month of repaying their preceding loan, several reasons might prompt their rapid subsequent loan applications. Hopefully, it means they would rather make use of another loan – while available – than use their own savings. Additional research is required on this point.

It is evident that farmers who have access to a bank account and/or a mobile wallet paid off their loans in a more timely manner than those farmers without such financial mechanisms did. The same can be said for women, who repaid their loans in a more timely than their male counterparts did. The farmers in the Belas community who formed part of the Gestao de Cereais project were found to be significantly more financially included[13] than were other farmers noted in results referenced from other research projects. The main reason for this was that farmers were encouraged to open a bank account or a mobile wallet account (although not compulsory). The justification was (as indicated above) that, once considered 'financially included', farmers seem to act more responsibly in the repayment of their loans, which also indicates that they seem to recognise the value of credit.

The repayment rate was better for farmers who had already repaid their first loan and moved on to their second, third or fourth loan, and this had a spill-over effect in that farmers with higher loan values also had better repayment rates, up to 100,000 metical, after which the repayment rate worsened significantly.

The importance of management and experience of the MFI, as well as of the training and experience of the borrowers, was realised in that farmers' repayment rates strengthened from 2019 to 2020. The management of Gestao de Cereais was more cautious with respect to loan size and the screening of loan applicants, as well as the management of the field credit officers. The borrowers who managed to repay their first loans and move to a consecutive loan were also more familiar and comfortable with the loan application and repayment process.

The database was an essential tool for enabling the author to extract and use the data needed for the analysis in this Dissertation. A database is a necessity in any meaningful analysis that needs data, and the continuous use of a well-structured, state of the art database by an MFI is critical. The database should preferably allow for the capturing of data from multiple organisations and individuals, including the farmers, relevant to a specific project, and should enable interested parties, including management and researchers, to extract the data easily, in a systematic manner.

13 In accordance with the definition of 'financial inclusion' as used in this Dissertation, set out in Section 4.3.8 'Financial inclusion'.

8.2 RECOMMENDATIONS AND POLICY IMPLICATIONS

Microcredit has the potential to reduce poverty and create opportunities for farmers to increase their input procurement and therefore increase the output of their farming operations, this will not only affect the farmers and their direct family but has the potential to indirectly increase the livelihoods of the other people in the community through job creation.

In light of the findings of the research paper the following general recommendations and policy recommendations can be made:

Microcredit needs to be made available to smallholder farmers, irrespective of the collateral these farmers have to offer. The terms and conditions with respect to the repayment of loans should be flexible and adaptable according to every individual farmer. Credit must be awarded and paid out in a timely manner, to ensure the farmers are able to purchase the required inputs to successfully manage their crops/livestock.

MFIs must integrate training programs when making credit available to farmers, this training should not only be of a financial nature but training with respect to successful farming operations should also be available to the farmers to ensure that they are as profitable as possible.

Due to the high transaction costs associated with microcredit, borrowers could easily fall into a debt trap if the MFI can increase their costs too much. This should be a competitive market with many role players ensuring the credit is given at the best possible price. To achieve this, the barriers to enter the market needs to be low and the policies need to accommodate these easy access markets.

8.3 PROPOSAL FOR FURTHER RESEARCH

As pointed out in Section 1.5 ‘Delineations and Limitations’, many research areas have not been covered, the future study of which would provide further insight on the value of credit. Some key areas include:

(1) The mapping of the Belas farmer lands, with the objective to determine the field size per farmer and per product planted. The will in turn make it possible to compile a production and income budget. Only then could the value of credit – compared with the cost – be accurately assessed. It would also make it possible to assess the return on additional investment, such as irrigation equipment. Smallholder farmers are no different to

commercial farmers when it comes to calculating a production budget, profitability, and return on investment.

(2) Education: The value of education in teaching farmers financial and business skills cannot be emphasised enough. This, coupled with extension services that teach them Good Agricultural Practices (GAP), is invaluable. Teaching is only one aspect, as it also requires monitoring (recording-keeping) and research to assess the success thereof.

(3) Database record-keeping: NGO programmes, and even for-profit company services, do come and go. However, farmers and communities remain. It is imperative to maintain good record-keeping. This project started with no records. After only 15 months, with the aid of developing a proper database and good record-keeping as presented in CHAPTER 5, the project was able to analyse many aspects related to the value of credit. More investment is required in terms of details required for record-keeping. This will enable enhanced and better research results.

(4) Income data capturing: Information, such as sales prices per unit over a period of time and units sold, should be captured to determine the income that the farmers generate from their farming operations. This will allow greater in-depth analysis to be done of the value that credit can add to a farmer. In other words, does, for example fertiliser and chemical application, make a difference to the volume and quality of output?

(5) Scaling-up: The World Bank Vanduzi irrigation project originally covered an area of eleven irrigation schemes similar to Belas. Apart from Belas, where the project could still grow, it could be expanded to cover the rest of the irrigation schemes and other similar schemes/project elsewhere in Mozambique.

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ANNEXURE 1: FARMER PROFILE ON DATABASE

Client Profile

System : Production

Date Printed : 30 January 2020 11.47

Farmer Unique System ID No:	011286		
First Name:	Elias		
Second Name:	Pita		
Surname:	Maradza		
Date of Birth:	01-Jan-1984		
Gender:	Male		
ID Number:	060104631310Q		
Nuit:	131354576		
Email:			
Cell Phone 1:	+258845156498	Vodacom Mozambique	Vodacom M-Pesa
Cell Phone 2:	+258864396820	Movitel Mozambique	
Office / Other:			
Start Date:	27-Oct-2017		
Address:	Belas, Vanduzi, Vanduzi District, Manica Province, Mozambique		
Financier / Bank Name:	Moza Banco, SA		
Universal Electronic Code:			
Account Number:			
NIB:	003400001714302610115		

Documents Uploaded

File Type	File Name	Date
Loan Agreement	Maradza, Elias Pita_Loan agreement_5106_27Jun19 signed.PDF	29-Nov-2019
Loan Agreement	LoanAgree6_Maradza, Elias Pita_29050_StarkeA_31Oct-29Feb19 signed.pdf	23-Nov-2019
Financier Documents	Maradza, Elias_Moza 25Jul19.pdf	30-Jan-2020
Nuit Front	Maradza, Elias Nuit 6May14.pdf	30-Jan-2020
Loan Agreement	Maradza, Elias Pita_Loan agreement_46084_7Feb19 signed.pdf	21-Jul-2019
Loan Agreement	Loan Agreement_Maradza, Elias Pita_v1_7Feb19 extension_7Jun19 signed.pdf	21-Jul-2019
Loan Agreement	Maradza, Elias Pita_Loan agreement_5106_27Jun19 signed.PDF	21-Jul-2019
Financier Documents	Maradza, Elias Pita_Moza Banco 25Julho19.pdf	05-Dec-2019
Loan Agreement	LoanAgree9_Maradza, Elias Pita_6800_StarkeAyres_22Jan-31May20_Signed.	28-Jan-2020
Photo (Head & shoulders)	Maradza, Elias Pita_H&S.PNG	25-Nov-2018
Identification Card Front	Maradza, Elias Pita_ID front.PNG	25-Nov-2018
Identification Card Back	Maradza, Elias Pita_ID back.PNG	25-Nov-2018

System : Production Date Printed : 30 January 2020 11.47

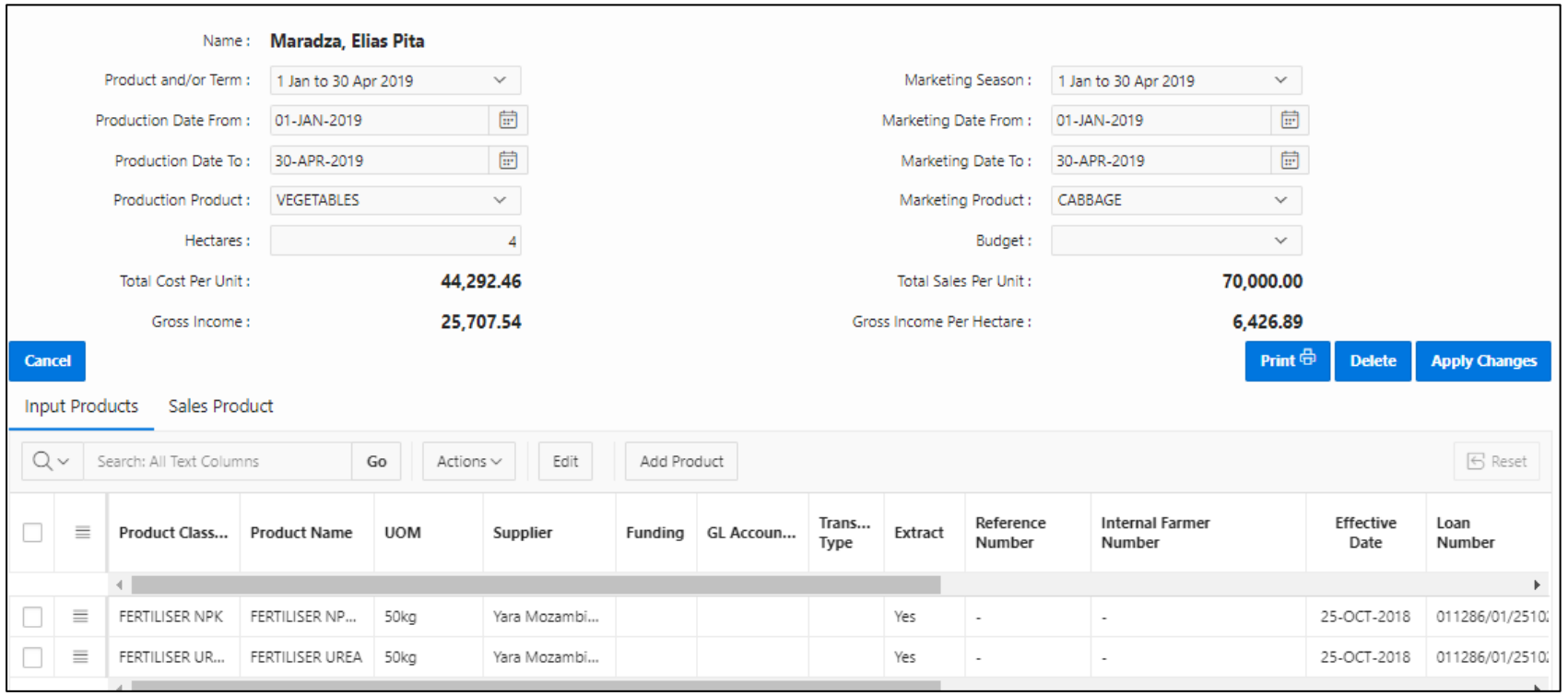
Parties linked to this Farmer

Farmer Unique System ID No:	011286
First Name:	Elias
Second Name:	Pita
Surname:	Maradza

Party Name	Party Number	Party Type
Belas Group 2	014925	Groups
Belas Potato	015576	Groups
Gestao de Cereais	014834	Financier/Bank
MCel Mozambique	013074	Mobile Network
Movitel Mozambique	013077	Mobile Network
Moza Banco, SA	014828	Financier/Bank
Starke Ayres	015771	Supplier
Vodacom M-Pesa	013070	Mobile Wallet
Vodacom Mozambique	013073	Mobile Network
Yara Mozambique	014847	Supplier

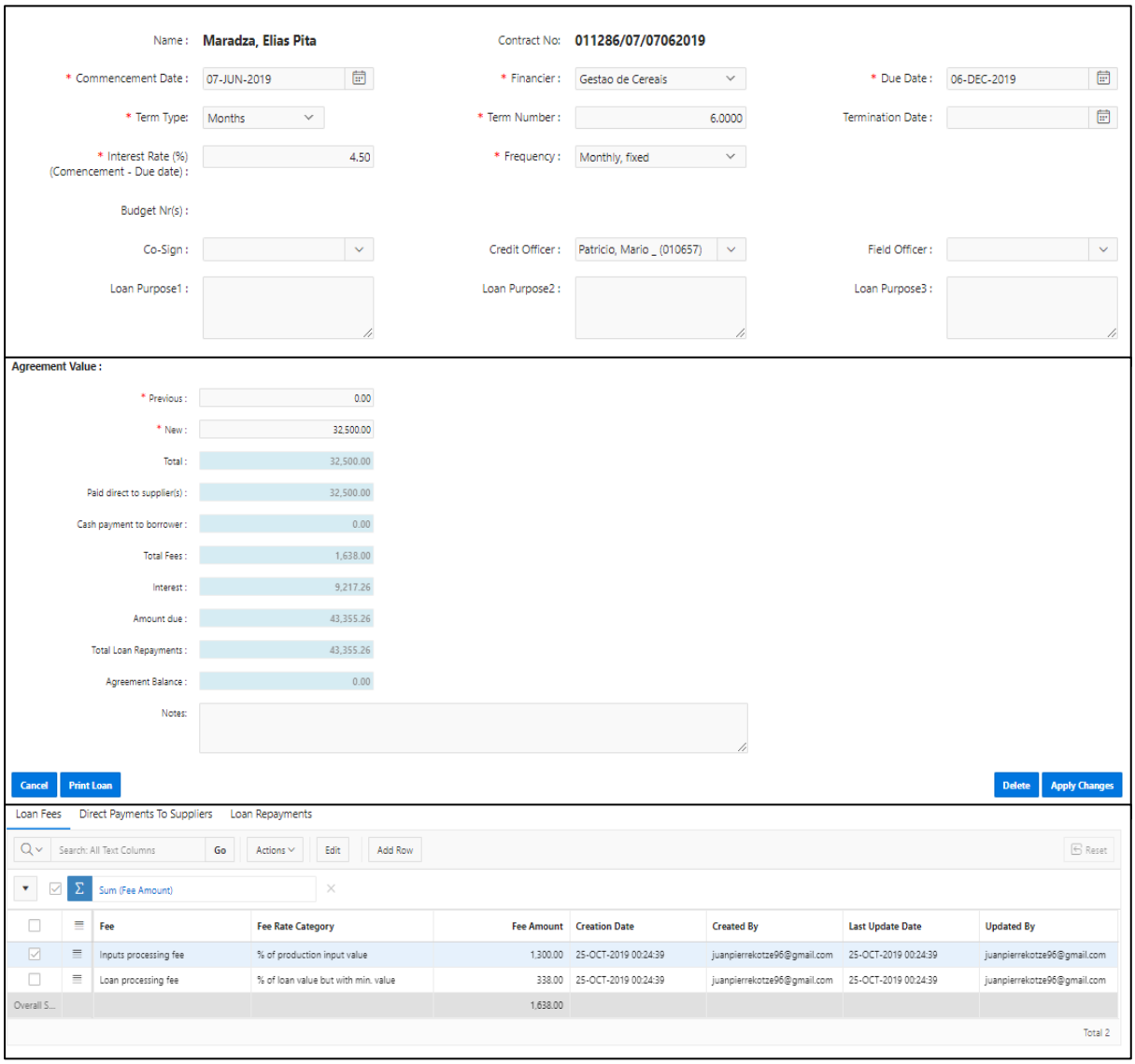
Source: APPSolve (2020)

ANNEXURE 2: PRODUCT PORTFOLIO ON DATABASE



Source: APPSolve (2020)

ANNEXURE 3: LOAN FORMAT ON DATABASE



Source: APPSolve (2020)