

KfW Development Bank

»» Materials on Development Financing



No. 11, September 2017

Profitability and indebtedness of farm borrowers in Madagascar

Authors: LFS Financial Systems GmbH

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Executive Summary

Background

Despite the success of microfinance to increase access to finance for micro, small and medium enterprises (MSMEs) in urban areas, outreach to agricultural MSMEs is still low. Here, low income and profitability as well as high entrepreneurial risks of farmers are often considered to be the major causes. Based on these assumptions, subsidies, e.g. in form of matching grants or reduced interest rates, are being requested and by that reviving a debate which already led to controversial discussions during the last decades .

However, the past has shown that subsidies need to be carefully designed if they are to cause less harm than benefits. The more indirect the expected effects of subsidies are, the more complex it is to evaluate their costs and benefits. Taking the example of interest rate subsidies: Would lower interest rates help farmers to get better financial access? Experience with subsidized interest rate programs show that the politically targeted farmers were not necessarily reached. Windfall gains in such programs were large and allocation efficiency was often dramatically low.

This brings up the question whether we do know enough about the financial situation and risks of farmers, especially those eligible for credit. **What are the reasons why financial institutions and especially microfinance institutions (MFIs) still have limited outreach to rural clients? Are profitability and income of small farmers really so low that they are credit rationed by MFIs? Is there a need for subsidies to improve their access to finance?**

In order to shed light on these questions, KfW has commissioned LFS Financial Systems GmbH (LFS) to conduct a study on “Profitability and indebtedness of farm borrowers in Madagascar”.

Authors

Starting as a consulting firm, LFS is a manager and investor in MSME finance in developing and transition countries through its participation in AccessHolding. KfW maintains a strategic partnership with LFS and is one of the holding’s largest shareholders with 13.89%. By cause of its position in its network of commercial banks and MFIs LFS has access to sensitive data which have proven valuable in depicting and analysing strategic questions regarding microfinance and the development of agricultural MSMEs. For the purpose of the study the agricultural loan portfolio of AccèsBanque Madagascar (ABM) was investigated which belongs to its network of MFIs and can be seen as a forerunner in the fields of rural and agricultural finance in Africa. Due to its ample experience ABM was able to build up an agricultural loan portfolio countrywide, based on a clear strategy and procedures with different agricultural loan products including credits for agricultural production, storage of harvests and MSMEs.

Due to its both land and water-locked geographic structure Madagascar remains a mainly agricultural economy and, hence, extremely vulnerable to climate risks. The loan products offered to farmers are the result of a comprehensive pre-establishment process including thorough market research, project design and business planning. The rural outreach development of ABM can therefore be considered as typical for MFIs in developing countries and its products as very well adapted to farmers’ needs. Findings and recommendations of this study are (given that one single country is considered) with limitations transferable to similar institutions in other regions with similar agricultural sectors.

Objectives and Methodology

The feasibility study attempts to investigate the profitability of different agricultural MFI borrower groups, identify determinants of access to finance, assess the adequacy of financing conditions for these borrower groups and, finally, assess feasible promotional instruments for agricultural finance. In order to address these objectives, LFS has quantitatively evaluated the data of almost 60,000 borrowers of ABM. Desk research, interviews with key experts and case studies among smallholder farmers in Madagascar supplemented the research.

Main findings

Investigations conducted reveal a generally high profitability (measured by the return on assets, RoA, which is defined as net income from business operations divided by total business and household assets) among agricultural and non-agricultural borrowers. This is valid for all income groups. Using ABM borrower data, the RoA were calculated for each borrower segment (see table below).

	Number of cases	RoA	Effective interest	Repayment obligation/ business expenses
Total agricultural borrowers	12,106	263%	33%-87%	n.a.
- Crop farmers	5,492	146%	45%-87%	52%
- Livestock farmers	2,410	153%	33%-64%	n.a.
- Rice price speculators	124	240%	45%-87%	n.a.
- Other agro firms	4,080	487%	33%-64%	n.a.
Total non-agricultural borrowers	46,703	294%	33%-64%	14%
- Micro borrowers	46,268	296%	33%-64%	n.a.
- SME borrowers	435	62%	33%-64%	n.a.
All borrowers	59,461	289%	33%-87%	n.a.

However, comparing the RoA of the different groups of borrowers reveals that crop and livestock farmers are only half as profitable as other MSMEs. A multiple regression analysis confirms this result. Case studies among farmers uncovered that the low profitability of crop and livestock farmers is linked to the lack of skills and even basic technology (such as the proper use of fertilizers). Compared to benchmarks set by a local agricultural institute, preliminary case studies suggest that crop farmers have the potential to at least double their revenues per hectare land.

The relative share of repayment obligations on income and cost variables is considerably and statistically significantly higher for agricultural borrowers than for non-agricultural borrowers. Repayment obligations stress agricultural borrowers more than non-agricultural borrowers and – at least for borrowers of ABM – further increasing repayment obligations may lead to client over-indebtedness and an increased credit risk.

The study further reveals that agricultural MSMEs with access to finance wait longer to receive a loan and receive relatively lower financing volumes (compared to what they request for) than non-agricultural firms. It is found that those firms which have access to loans are facing adequate financing conditions. However, prohibitive transaction costs lead to an underserved demand among agricultural firms.

Under the current circumstances, LFS believes that farmers with access to loans are adequately served based on the technology they employ at the moment. These borrowers may further benefit from efficiency gains that could

be realized by financial institutions (FIs). Likewise, small scale farmers that are currently excluded from the formal financial sector could be served at reasonable costs if transaction costs can be brought down. The productivity of agricultural firms could be greatly increased if they made heavier use of simple technology.

Promotional instruments to enhance agricultural finance

Transaction costs can be brought down by employing decentralized systems to serve rural customers. This mainly includes agent banking, mobile payments and mobile banking, but also other technologies and systems that allow reaching out and communicating to farmers in an efficient manner. It should be noted that the establishment of such channels involves considerable upfront investments for the respective IT infrastructure. Promotional instruments include concessionary loans for FIs to design and implement such systems and to bring them to scale combined with grants for relevant feasibility studies and loan accompanying consultancy services for their sustainable implementation.

Instruments	Description	Estimated potential	Recommended timing	ABM
Instrument 1	Grants to FIs for a non-banking agent partnership or a mobile payment service	high	immediately	Primary importance
Instrument 2	Concessionary productivity enhancing credit lines for lending to farmers	medium	medium-term	Primary importance
Instrument 3	Grants for extension services to farmers in combination with credit	high	immediately	Indirectly important

Extension services to counsel new cultivation methods can lead to higher yields and increased income for participating farmers, although this will also increase their risks. At the same time, concessionary loans accomplish an increased outreach to farmers and allow them to invest in fixed assets. Finally, alternative delivery channels (mainly for loan repayments) will result in lower financing costs for farmers and can increase outreach to areas that are presently unserved.

The use of even simple technology by farmers has the potential to increase their key performance indicators (KPIs). Special credit lines to finance fixed assets (such as cows or machinery) or fertilizers could help farmers to increase their profitability. However, such credit lines need to be accompanied by intensive training and awareness-raising measures for farmers to ensure the money is invested rightly, and loans have a well-controlled credit risk. An adequate promotional instrument would be concessionary loans for these purposes, accompanied by TA grants for training of farmers.

Value chain finance has the potential to increase FI efficiency in the information gathering process and, thus, to improve outreach to agricultural firms. Value chain finance is barely existent in Madagascar because value chains are very loose and mostly not well defined. To promote agricultural value chain finance, an effective instrument would be of assistance by setting up the respective infrastructure, namely defining value chains. Once such value chains have been established, FIs can utilize them to design respective products to increase outreach while decreasing information costs and controlling risks efficiently.

The results of this study show that possible measures and policy instruments must be well targeted addressing first and foremost lower profitability of small farmers.

1 Introduction

1.1 Background

Despite the success of microfinance with small firms in urban areas, it has achieved significantly lower outreach among small agricultural firms in rural areas. Financial services are generally more expensive and have lower penetration rates in rural areas, due to lower population density and the corresponding higher transaction costs. However, for rural agricultural access to finance is further restricted for a variety of reasons. In addition to higher costs, MFIs must develop their own agricultural expertise to support the loan analysis process, manage sector-specific risks related to weather and price fluctuations, and develop differentiated products that account for seasonality and alternate forms of collateral (such as livestock).

Although MFIs have innovated with means such as agricultural insurance, mobile banking, or products with flexible repayment plans to overcome these obstacles, microfinance has still not achieved widespread success among smallholder farmers.

In order to foster agricultural lending by MFIs, KfW is working with the German government to investigate the potential of promotional instruments for agricultural finance (e.g. grants, concessionary loans, guarantees to the end customer). It is currently assumed that the agricultural sector is less profitable than other sectors and hence, that the interest rates that are offered are disproportionately burdensome for clients (compared to non-agricultural peers) and that this ultimately limits credit access.

1.2 Objective

The study's objective was to evaluate (i) the profitability of different MFI borrower groups by sector and (ii) the determinants of access to finance for, and financing conditions of, these groups. In a third step, the study assesses feasible promotional instruments for agricultural finance.

Under the feasibility study a microfinance institution was investigated. It belongs to a network of MFIs, *AccessGroup*, which has previously been supported by the German Financial Cooperation.

AccèsBanque Madagascar or ABM, is an MSME finance bank headquartered in Antananarivo, the capital of Madagascar. The MFI does not have its primary focus in agriculture, though it states the sector is of strategic importance for the institution and has statistically large enough portfolios to be considered for the study. Given the background in which KfW initiated this study, this makes the FI an ideal target for the investigations.

1.3 Methodology Used

The study attempts to compare the financial conditions of smallholder farmers with those of non-farm MSMEs using borrower data from ABM. The profitability of the different client segments (i.e. agro vs. non-agro borrowers) is estimated from a bank perspective. The financing and operating conditions both of farms and banks are assessed to identify areas of improvement. Then, an overview of promotional instruments that are widely used to foster agricultural finance is given and these instruments are evaluated against the country context. The study concludes with recommendations on the use of promotional instruments for agricultural finance using Madagascar (and more specifically ABM and its clients) as a case study.

Specifically, the study was organized into three distinct phases, as described below.

1.3.1 Task & Milestone 1

Selection of KPIs: The first phase consisted of identifying key performance indicators for measuring the profitability of MFI borrowers, based on available borrower information. This was done by (i) identifying all potential KPIs that would allow LFS to evaluate the profitability of the target group and the determinants of its access to finance. It was also done by (ii) examining all data fields that are collected by Loan Officers (LOs) during the loan assessment process, and assembling a list of the available inputs for analysis. A resulting list of potential KPIs, and their significance, benefits and limitations, was then presented to and discussed with KfW. After the KPIs were selected, the relevant data fields were collected from the MIS systems of the participating banks.

Comparison of KPIs: The KPIs of agricultural firms were then compared to those of non-agricultural firms via a t-test. LFS also analyzed the evolution over time of the mean difference in profitability between agricultural and non-agricultural clients. Finally, relevant independent variables (for example, the client's age or the maturity of the business) were selected using statistical methods (regressions).

1.3.2 Task & Milestone 2

KPI Analysis: LFS conducted an in-depth analysis of the selected KPIs by considering available explanatory variables through the application of a multiple regression approach.

Overview of Financing Conditions: LFS obtained market information on current financing conditions that included effective, nominal and real interest rates, loan tenure, and collateral needed. Relevant information was collected from the marketing units of ABM, from conducting interviews with key stakeholders (former and current managers of these FIs), and by conducting desk research.

Impact of KPIs & Explanatory Variables on Credit Access: In order to investigate the determinants of access to credit, LFS conducted a multiple regression analysis using proxies for access to credit.

Relative Share of Repayment Obligations: LFS compared repayment obligations to several factors: total business income, total business plus family income, total business expenses, and total business plus family expenses. This was then compared between agricultural and non-agricultural borrowers.

Assessment of adequacy of financing conditions: LFS evaluated the adequacy of financing conditions considering KPIs, their explanatory variables, repayment obligations, cost of lending, and risks for different groups of MSMEs. Respective indicators were created to facilitate the evaluation. A focus of this analysis was to determine the different patterns of agricultural and non-agricultural lending, and to determine whether, from a lender's point of view, one of the two sectors is currently more attractive.

Assessment of impact of subsidies on the sector: LFS quantified the effect of subsidies on borrowers, their KPIs and explanatory variables based on the previous analysis. It was further analyzed whether such subsidies can positively influence the number of borrowers as well as the average loan amount.

1.3.3 Task & Milestone 3

The third task that guided the study consists of:

- An *overview of feasible types of promotional instruments for agricultural finance*, including their mechanisms and key features;
- An *assessment of effectiveness and efficiency of the different types of promotional instruments* based in the context elaborated in tasks 1 and 2.

The main objective of the third part of the study is to recommend promotional instruments (see Box 1 for an explanation of “promotional instruments”) for agricultural finance, and to outline their design. It is understood that such instruments need to be in line with sound financial sector development principles, i.e., that the interventions do not distort competition in the financial sector and are designed with the sustainability of the financial service in mind. More specifically, this section will

- assess “whether promotional instruments for agricultural finance have the potential to accelerate agricultural lending especially to small scale farmers; in other words, to either increase credit access for agricultural firms or to reduce the repayment burden for agricultural firms”, and
- assess “whether there is a need for subsidies (e.g., grants, concessionary loans, guarantees to end borrowers) for agricultural finance and if so, how they should be designed to be incentive compatible and avoid distorting competition in the financial sector”.

The study part is based on:

- Inputs from parts 1 and 2 of the study;
- Collection and analysis of data from and experiences of Access Bank Madagascar, its management and staff;
- Desk review of national and international publications (see list of references in Annex 1);
- Interviews with financial and agricultural experts, MFI clients in Madagascar, and donor representatives in Madagascar (findings from interviews with clients are located in Annex 5);
- Inputs from LFS advisors.

The study concentrates on a certain spectrum of agricultural finance, namely **smallholder finance**. Hence, the needs and potentials of their business and households are in the focus here. This means that we will not consider

Box 1: Defining promotional instruments in agricultural finance

Forms of support

- Technical assistance in the form of grants, or training
- Financing instruments such as equity investments, guarantees or line of credit.
- Sector support
- Government (regulation, strategies, policy)

Target group/recipient

- Financial institutions
- Sector institutions, e.g. training institute, wholes-sale facility, association
- Clients

Modality of support

- Loan
- Grant
- Investment
- Public good, e.g. weather data, financial education

Channel for support

- Direct cooperation with one FI
- National programme
- Global programme

Sector to be supported

- Financial sector
- Agricultural sector, e.g. warehouses, or farmers associations.

Strategic approach taken

- Green-fielding
- Fostering innovations
- Building client capacity
- Building financial sector infrastructure
- Financial services in the value chain

This study will use three categories at which promotional instruments are directed:

- A – Financial sector
- B – Financial institutions
- C – Client

financing of the broad range of agricultural related activities, such as input supply, production, distribution, wholesale, processing and marketing, nor the stakeholders involved in these activities (see also types of agricultural finance)¹.

¹ This refers to agricultural lending to larger firms, i.e. commercial farmers and agro processors. Agricultural value chain finance takes into account inter-linked processes from farm to consumer, and includes the variety of value-chain actors using both perspectives to increase efficiency and to lower risk in lending. Rural microfinance provides financial services for low income people (in rural areas) by offering smaller loans, savings services, and micro-insurances, while accepting a wider variety of assets as collateral. Smallholder finance focuses on the small agricultural producer.

2 Agricultural Finance in Madagascar

2.1 Overview of the financing conditions

2.1.1 Financial Institutions Active in MSME finance

The following table provides an overview of FIs that serve MSMEs in urban and/or rural markets in Madagascar. All of the FIs finance business activities related to agricultural, and five of the seven offer loans to farmers to store their crop. Of these, three FIs provide agricultural loans to farmers². For the purpose of this study, an ‘agricultural loan’ is defined as a credit provided to a business that derives the majority of its revenues from cultivating crops, and which is usually used to continue crop cultivation.

Table 1 Financial Institutions active in agricultural finance in Madagascar

Institution Name	Type of Financial Institution ³	Number of Points of sale	Gross Loan Portfolio EOY 2014 (EUR) ⁴	Number of loans outstanding	Average loan size (EUR)	Storage loans to farmers	Agricultural loans to farmers
AccèsBanque Madagascar	Bank	26	24,950,291	31,388	795	Yes	Yes
MICROCRED	Bank	27	28,378,761	76,155	373	Yes	No
ACEP Madagascar SA	IMF3 non mutualist	39	13,018,532	10,466	1,244	No	No
SIPEM	Non-mutual, Tier 3	13	6,653,079	4,205	1,582	No	No
PAMF	Mutual, Tier 3	13	5,624,319	67,242	84	Yes	No
OTIV	Mutual, Tier 2	150+	24,005,116	74,350	323	Yes	Yes
CECAM	Mutual, Tier 3	211	19,066,565	68,700	278	Yes	Yes

Among these institutions, the microfinance banks AccèsBanque Madagascar, Microcred, and the decentralized cooperative OTIV, have the largest portfolios⁵. Commercial banks were also considered in this study, as some compete for MSME loan customers by providing consumption loans to salaried workers who also own an

² In addition, there are numerous smaller FIs who offer ‘agricultural credit’ regardless of if the client’s primary revenue source is farming. However, these institutions usually have a smaller geographical coverage and are limited in loan size, and do not report to MixMarket.

³ Institutions defined as banks are allowed to offer credit, accept deposits, and offer a range of other services. The other institution type listed, IMF2 and IMF3 may extend credit to, and take deposits from, the public. However, if the institution is ‘mutualiste’, it may only conduct these activities with registered members of the cooperative, and members are required to keep a minimum level of savings with the organization. More information is available on the Central Bank website, law # 2005-016: http://www.banque-centrale.mg/index.php?id=m4_4_1_3.

⁴ As most recent portfolio information was not available from all institutions, GLP was estimated using latest available data from MixMarket and applying the average annual growth rate among selected institutions. In the case of OTIV, data is cumulative for all of the individual ‘OTIV’ institutions reporting to MixMarket. Number of loans outstanding was estimated by applying the last available loan-to-GLP-ratio to the 2014 projection.

⁵ Largest total portfolios. Portfolio breakdown by product type was not available from the institutions that were studied, except in the case of ABM.

enterprise. However, market research showed that such FIs generally target wealthier, non-agricultural clients and are largely absent from the area of agricultural finance in the Madagascar market⁶.

2.1.2 Types of Agricultural Finance in Madagascar

At present there are primarily three types of credit products offered to agricultural firms by the institutions listed above.

Table 2 Product types in agricultural finance

Type of Product	Target Group	Loan Size Range	EAIR ⁷ Range	Term (average)	Collateral
1. Credit for Agricultural Production (farming)	Farmers	EUR 110-4,200	47-87%	10 months, 3-4 month grace period	80-150%
2. Credit for Storage of Harvest	Farmers, Traders	EUR 150-56,000	24-58%	7 months, bullet payment	100%+(crop is collateral)
3. Credit for Enterprises (agricultural and non-agricultural)					
(a) Micro enterprises	MSMEs	EUR 30- 5,600	39-79%	12 months, no grace period	80-150%
(b) Small & medium sized enterprises	MSMEs	EUR 4,600-56,000	33-60%	12-24 months, no grace period	80-150%

The agricultural sector in Madagascar produces a variety of crops and livestock; farmers grow multiple crops⁸ throughout the year for both self-consumption and sale. Due to both the types of crops grown and the topography of the land in Madagascar, many farming activities are highly labor intensive and do not require the use of heavy machinery. As such, agricultural credit products generally target working capital requirements and finance items such as hired labor. This is in contrast to agricultural sectors in other countries in Sub-Saharan Africa, where WCR finances inputs and fertilizers, and fixed asset financing is also in demand.

The following sections describe the conditions and limitations of the three products, as presently found among surveyed MFIs in Madagascar, and observations on the financing conditions overall.

2.1.3 Credit for Agricultural Production

At present there are primarily two types of credit offered to smallholder farmers. The first is a standard loan product for agricultural production that ranges from ~EUR 110 to EUR 4,200, and is offered by three major financial institutions (ABM, OTIV, and CECAM) to persons or enterprises that derive the majority of their revenues from the

⁶ This is when one considers micro, small and medium-sized businesses. Larger agricultural businesses are served by commercial banks, but with traditional banking products. The terms of these products can be seen in the Annex attached to this report providing an overview of all major FIs.

⁷ EAIR denotes effective annual interest rate, taking into account fees, forced savings, interest rate type (flat or declining), repayment schedule, and loan tenor. These numbers were calculated using the interest rate calculator tool published by MFTransparency.org.

⁸ Rice, cassava and maize being the most common.

cultivation of crops. The loan is generally used to finance the working capital requirements of crop cultivation, though the client may also use it to finance other business lines (livestock, food stuffs transformation, etc.)⁹.

In line with best practice, ABM conducts a loan analysis that involves a visit by a LO to at least half of the area under cultivation, where he or she uses a 'Crop Card' to support an evaluation of the technical elements of production (expected yields, crop-specific risks, etc.). The other FIs who offer this credit follow similar practices.

For this product, collateral can include land, vehicles, livestock, household goods, and forced deposits. In the case of farmland, it may only be accepted as collateral if it has been purchased within the last five years¹⁰. It should be noted, however, that this does not necessarily pose a challenge for farmers seeking credit; conversations with ABM management revealed that while a lack of collateral can potentially limit loan size for these clients, most often the limiting factor for clients is their repayment capacity.

In addition to ABM, CECAM, and OTIV, there are multiple smaller FIs (tier 1 and 2) throughout the country, which offer loans to farmers without conducting a farm-specific analysis. From our experience, LFS has found that institutions with such practices fail to serve the client group very well because the product reflects neither the risks nor the repayment schedule specific to crop cultivation.

2.1.4 Credit for Crop Storage

The second credit product offered to smallholder farmers and crop collectors is the 'storage loan', which ranges from EUR 150 to EUR 56,000 and is offered by 5 FIs. With this product, the FI offers the client a credit in exchange for storing his or her crop in a warehouse for up to 9 months after the harvest. This allows the client to wait for the market price of the crop to increase, as prices are generally lowest immediately after the harvest. When the client sells the product, he or she also repays the loan.

The credit may be used by the client for several purposes, one of which is working capital requirements (e.g., to pay laborers who were hired to work during the harvest period). Alternatively, it may be used to pay school fees or to finance the planting of cash crops.

The storage loan is extended to agricultural producers, similar to the 'agricultural loan' previously described. However, in many ways it is different from this product. Specifically:

- The FIs use the crop being stored as collateral, which many FIs find preferable to 'traditional' collateral because it has a more transparent market value and is easier to seize and liquidate.
- The origination process requires less investment on the part of the FI, as the LO is not required to undertake a detailed analysis of the farm activity. As a result, the FI's operating costs per client are lower.
- When the client stores his or her product in the warehouse of a FI, he or she is responsible for the cost of transporting it to the warehouse. No repeat visits are required on the part of the LO to check on the product, so again, operating costs for the FI are lower.

⁹ In the case of ABM, this sort of credit is only extended to small farmers or enterprises that derive at least 50% of their income from growing crops.

¹⁰ This is a measure practiced by ABM, due to the difficulty of obtaining the true market value of the land and of seizing it in the case of non-payment.

- Compared to ‘classic’ agricultural loan products, storage loans are only appropriate at one specific time of the year, and will not be renewed after repayment. As a result they do not lead to portfolio growth and may be less attractive to FIs.

2.1.5 Credit for Business Activities in the Agricultural Sector

The third credit available in the agricultural sector is for MSMEs whose business activity is related to this sector: enterprises that raise chickens, butcher cattle, or transform raw dairy into another product, but do not cultivate crops as their primary line of business. These enterprises are served in two ways:

1. With non-agricultural MSME products of FIs who are located in rural areas. This may include institutions with in-depth agricultural knowledge, but who still chose to serve these clients with a standard loan product¹¹.
2. With agricultural products of FIs. In this case, the FI designs a product flexible enough to serve both farmers and non-farmers, and may consider agricultural elements in the analysis (crop risks, etc.)¹².

2.1.6 Observations on Financing Products

There are a limited number of actors in the agricultural finance sector in Madagascar, and smallholder farmers are still largely underserved; the heterogeneous nature of agricultural activities poses a challenge to financial institutions and policy-makers alike. For ABM, the risks and high operating costs often associated with ‘rural finance’ are in reality attributable to crop cultivation. As a result, agricultural loans have the highest effective annual interest rate of all its products (with customers paying 7% to 23% higher effective annual interest rates).

The following table shows the operating costs compared to revenues and products for each major product line at ABM. Although agricultural loan products have the highest gross portfolio yield (due to higher interest rates), it is still the least profitable of ABM’s product lines, both in absolute terms and in percentage terms.

Table 3 Cost analysis by product

	Micro	SME	Crop and storage loans ¹³
Revenues-to-expenses Ratio	1.5	1.35	1.17
Profit-to-expenses ratio	45%	32%	11%
Gross Portfolio Yield	44%	33%	54%

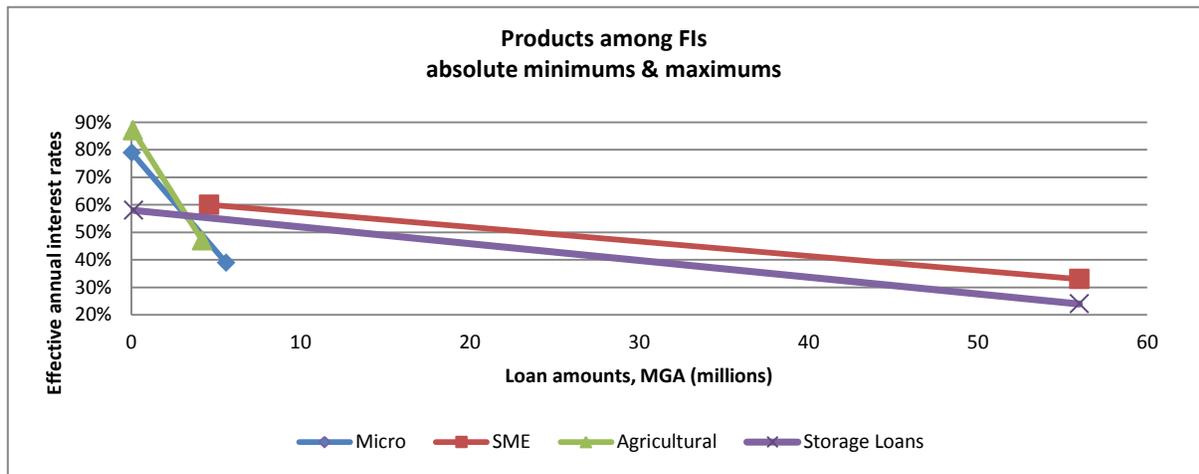
Higher interest rates for agricultural loan products are also visible when looking at the absolute minimums and maximums for interest rates and loan sizes among all studied FIs.

¹¹ For many FIs, such as ABM and OTIV, such businesses are provided with micro or SME loan products (depending on loan size), rather than an agricultural loan product. This is because LOs do not require detailed agricultural knowledge in order to assess the business.

¹² CECAM was the only institution found to offer such a product.

¹³ Includes both agricultural loan products and storage loan products; the latter is ~10% of the entire agricultural loan portfolio.

Figure 1: Interest Rate & Loan Amount Ranges on Products



It is interesting to note that storage loans, which also target the agricultural sector, are not necessarily the second most expensive product and are on average cheaper than MSME loans¹⁴. Further, several institutions (MicroCred, PAMF) provide such storage loans but do not offer ‘classic’ agricultural loans.

The limited supply of agricultural loans may have two causes: lack of demand from smallholder farmers, or lack of interest on the part of the FIs. As interviews with ABM documented that there is high demand among farmers, LFS feels it is more likely the latter: smallholder farmers do not yet present a tangible business opportunity for many FIs, due to the typical reasons (high operating costs due to remoteness, time required for loan analysis, weather or crop-related risks, etc.). Crop storage loan avoids many of these obstacles, and so enables FIs to profitably lend to the sector.

Box 2: Understanding differences in interest rates for agricultural loans

Among the three FIs, that do offer agricultural loan products (ABM, CECAM, OTIV), the two traditional cooperatives are able to offer lower interest rates (see table 1) than ABM. Possible reasons for this may include:

- lower cost of funding due to high deposit-to-loan ratio and possibly grants
- group loan structure may reduce bad debt recovery and administrative costs
- Client must be members of the cooperative and there is the likelihood of other activities cross-subsidizing lending activities
- an NGO rather than business-focus of the institution; possibly not profitable

LFS’s own experience, both within the AccèsBanque network and with external clients, has shown that most FIs struggle to profitably serve smallholder farmers.

When interviewed about the greatest barriers to accelerating agricultural lending, ABM management stressed the low repayment capacity and low agricultural productivity of farmers, as well as the high operating costs (for both

¹⁴ It should be noted that the very low interest rates on storage loans (~24%) are for very large loan sizes extended to traders rather than farmers. Still, storage loans for farmers were consistently found to be cheaper than agricultural loans.

the bank to reach these clients, and for the clients to travel to a branch to make payments)¹⁵. This problem could be partially mitigated by targeting more commercial farmers who can absorb higher loan amounts, but in the case of ABM would come at the cost of shifting its focus away from smallholder farmers. As a result, measures to increase the profitability of *smallholder farmers* are most relevant for this study.

The adequacy of the current financing conditions, and potential policy solutions to overcome the mentioned challenges, are discussed in a later section of this report.

3 AccèsBanque Madagascar (ABM) and its Lending Activities

3.1 Overview

AccèsBanque Madagascar, or ABM, is an MSME finance bank headquartered in Antananarivo (Tana), the capital of Madagascar. In brief, ABM has¹⁶:

- 29 branches across the country and 713 staff
- A gross loan portfolio (GLP) of almost EUR 30 million, of which approximately 5% are agricultural loans and 1% are crop storage loans
- 34,419 outstanding loans, of which approximately 12% are agricultural loans and 2% are crop storage loans

The bank started operations in October 2006 and initially concentrated its operations on serving urban MSMEs in Tana, in order to ensure full establishment of its policies, procedures, and processes and to strengthen its human resources. Geographic scope was then increased with the opening of the first rural branch in 2009.

3.2 Start of Agricultural Lending Operations

ABM has a clear commitment to serve smallholder farmers. As the agricultural sector is very important for the economy and rural population in Madagascar, ABM intends to serve the rural market with adequate financial products. There are only three major suppliers of credit to small scale farmers, apart from a few more that offer storage loans only. Since there is still little market saturation in rural Madagascar, ABM intends to increase its market share in rural areas by targeting farmers, rural entrepreneurs that are directly or indirectly related to agricultural value chains, and non-agricultural rural enterprises.

ABM launched an agricultural lending pilot in October 2010 out of the Mahitsy branch, located about 45 km outside of Tana. The location was chosen for its proximity to the Head Office to allow for careful oversight during the pilot. The pilot included the design of a new agricultural loan product, hiring of agricultural Loan Officers, and the development of an agricultural training program that focused on the crops and technical challenges specific to Malagasy farmers. After a successful pilot, a broader rollout took place throughout 2011, with five branches offering agricultural loans. ABM now has over half its branches in rural locations, which serve both non-agricultural and agricultural clients.

¹⁵ In fact, for these reasons the minimum loan size was increased from EUR 55 to EUR 110.

¹⁶ Data is as of August 2015.

3.3 Performance

The agricultural portfolio has demonstrated consistent overall growth, although total year-on-year growth rates have decreased over time. Slowing growth may be expected after the initial years of expansion, but can also be explained by some of characteristics of the typical agricultural finance customer (see below).

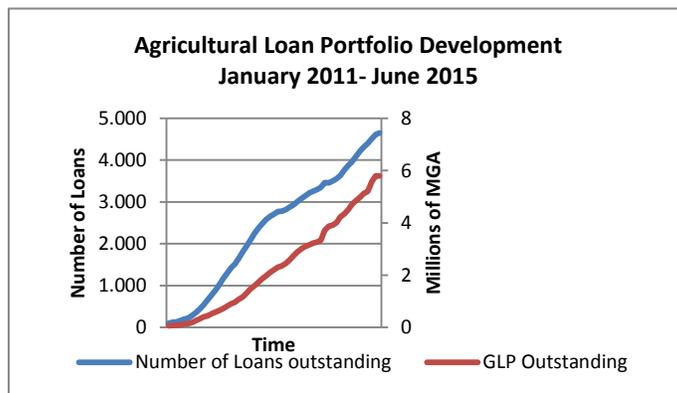
Box 3: Typical ABM agricultural finance client

The typical agricultural loan client of ABM is a smallholder farmer with .5-2 hectares of land on which he cultivates rice, and who takes a loan of EUR 330. In between rice harvests he will plant a small amount of cash crops or sustenance crops (such as tomatoes). The client will generally use the loan to finance labor costs for the farm, rather than for improvements in productivity (fertilizer, industrial seeds, or light machinery). LFS perceives that this is primarily due to a lack of farmer education as well as access to quality inputs. As a result the agricultural productivity of Madagascar remains one of the lower in the world¹⁷, and access to finance has so far failed to translate into meaningful gains for smallholder farmers.

ABM has attempted to increase loan size and client productivity by introducing the Crop Storage Loan, which allows the bank to reach additional agricultural clients as well as provide a complementary product to existing ones. While introduction of this product has been considered a success, major challenges to improving performance remain. Chiefly:

- Client receptiveness to new technologies: agricultural clients appear to be highly risk averse and will not adopt new farming technologies unless they are first proven to work.
- Geographical limitations: it is difficult to reach clients outside of a 25km radius of the bank with current lending technology. It is additionally prohibitively expensive for the clients to reach the branch for repayments.

Figure 2: Agricultural loan portfolio development



¹⁷ Average value added per worker is only USD 175 in Madagascar, compared with USD 688 India, which also relies on rice production. Source: World Bank Database.

Figure 4: Growth rates of agricultural loan portfolio

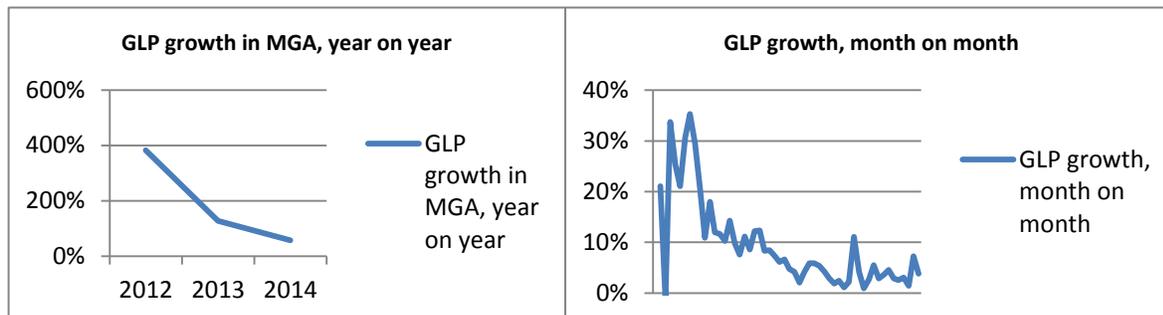
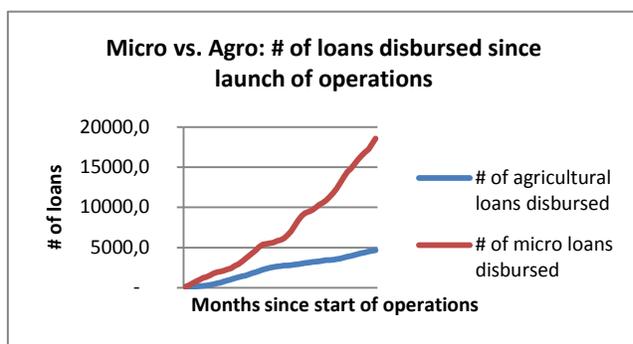


Figure 3: Comparison of micro & agro loan disbursements



3.4 Strategy for the Future

At present the agricultural loan portfolio has a weight in the total portfolio of about 6% by volume, a number which ABM management would like to see increase to 20% in the medium-term future of the bank. The Board and Management Team of ABM view the rural sector, including agriculture, as a critical area of future growth for the bank, and increasing rural outreach is a management priority. Not only is it home to the majority of the Malagasy population (~66%), but rural areas are widely underserved by financial institutions at present. As one Board Member put it, “In a heavily agrarian country like Madagascar, the agricultural sector must form a part of any bank’s strategic vision”.

At present, management is considering:

- Geographic expansion, which would reduce the bank’s exposure to a single crop (rice) and increase its footprint
- Alternative delivery channels such as agent banking, presently being explored in a feasibility study
- Value chain finance arrangements that would involve a partnership with an agricultural supplier and can provide clients with high quality inputs and possibly extension services

4 Performance of Agricultural and Non-Agricultural Borrowers

4.1 Overview of Analyzed Data on Borrowers

For the purpose of this study, agricultural borrowers are those that are engaged in activities related to agriculture. These include crop farmers, livestock farmers, those that store rice for speculation on price raises as well as all other MSMEs involved in agriculture (such as butchers, dairies, fresh fruit vendors). From a FI perspective, crop farmers (and also those that store rice) play a special role as these naturally do not have a steady cash flow.

In order to identify relevant KPIs for agricultural borrowers and non-agricultural borrowers, ABM has provided data from its MIS that were gathered during the loan assessment process. Data are available for all borrowers as at the disbursement of the last loan they have taken.

It is important to stress that the data were not gathered explicitly for this study, but rather as part of the loan assessment process. The process below describes how client data was obtained by LFS.

Particular concern has been posed on the possible presence of measurement error. Outliers of the distribution of observations have been dropped, and the final sample includes 59,461 loans. The table below reports the summary statistics for the data gathered from ABM's MIS. Monetary figures are in Euro, and figures from the profit and loss account represent monthly flows.

Table 4: Summary statistics for data on ABM borrowers (all monetary figures in EUR, converted at 0.00027 MGA/EUR)

Indicator	Total	Non-agro			Agro				
		Sub-total Non-agro	SME	Micro	Sub-total agro	Crop	Livestock	Warehouse	Other agro
Number of borrowers	59,461	46,703	435	46,268	12,106	5,492	2,410	124	4,080
Proportion of repeat borrowers	51%	52%	56%	52%	48%	43%	52%	60%	53%
Proportion of female borrowers	54%	57%	37%	58%	41%	28%	48%	50%	55%
Proportion of married borrowers	85%	85%	89%	84%	89%	91%	87%	90%	87%
Average number of family members	4.1	3.9%	4.2%	3.9%	4.5%	4.9%	4.1%	4.3%	4.1%
Median of beginning of entrepreneurship	2006	2007	2006	2007	2004	2001	2008	2008	2006
Proportion of borrowers with no other employment	98%	98.0%	96.6%	98.0%	98.3%	99.0%	96.2%	97.6%	98.5%
Proportion of loans for working capital only	72%	70%	47%	70%	81%	89%	69%	77%	77%
Proportion of loans for working capital and fixed assets	12%	13%	26%	13%	8%	5%	15%	13%	8%
Proportion of loans for fixed assets only	12%	13%	15%	13%	10%	6%	14%	7%	12%
Average deposits	27	30	181	28	18	7	29	11	26
Current assets	223	241	1,930	225	158	87	188	218	233
Stock	354	373	2,736	351	268	174	461	268	281
Fixed assets	1,192	1,300	14,134	1,179	812	769	1,179	1,173	642
Total assets	1,775	1,921	18,874	1,761	1,241	1,031	1,833	1,666	1,161
Total collateral value	1,876	2,019	17,932	1,869	1,341	1,063	1,651	1,827	1,517
Total collateral granted	1,848	1,989	17,659	1,842	1,318	1,062	1,637	1,827	1,457
Liabilities to other FIs	268	69	870	61	41	36	49	56	43
Advance payment from suppliers	24	24	447	20	24	20	24	30	30
Advance payment from clients	6	7	75	6	3	1	5	7	4
Sales	12,645	13,469	82,739	12,818	9,640	2,312	7,235	10,777	20,891
Receivables	2,095	784	8,842	708	1,077	1,203	850	640	1,056
Other income	436	460	1,992	446	352	277	563	396	327
Gross income	12,989	13,831	84,162	13,169	9,924	2,551	7,686	11,101	21,134
Costs of sales	9,545	10,255	62,677	9,762	6,992	520	4,216	7,889	17,316
Operational costs	1,113	1,102	9,030	1,027	1,148	726	1,668	944	1,415
Payables	3,818	385	5,581	336	276	181	176	252	465
Family expenses	1,015	1,092	3,568	1,069	718	341	903	1,009	1,106
Total business income (sales)	12,645	13,469	82,739	12,818	9,640	2,312	7,235	10,777	20,891
Total business expenses (cost of sales + operating costs)	10,658	11,357	71,707	10,789	8,140	1,246	5,884	8,833	18,731
Business income – business expenses	1,987	2,112	11,032	2,029	1,500	1,066	1,351	1,944	2,160

The sample contains information on borrowers with loans that were disbursed between February 2007 and February 2015. Out of these loans 79% are for non-agricultural borrowers and 9% for crop farmers. Moreover, before 2010 no loans for crop farmers were granted and in 2011 information is only available for very few crop farmers.

The average client is 41 years old, married, lives in a household with 4 family members, has a business since 2006 and has no other employment. Around one fourth of the loans were disbursed to entrepreneurs in the grocery and clothing sectors and 85% of the loans were disbursed to support the firms' working capital. Somewhat more than half of the borrowers (54%) are female, while most (72%) of the crop farmers are male.

Deposits of borrowers are rather small. On an average, borrowers report to have deposits of EUR 27. Average business assets amount to EUR 1,775, whereby crop farmers possess 68% less business assets than non-agricultural firms.

Cash-flow information on borrowers reveals the greatest difference across the sectors: The monthly sales of non-agricultural firms amounts to EUR 13,469, while the monthly sales of crop farmers amounts to EUR 2,312; and while 87% of the business costs of non-agricultural firms are costs of sales, half of all the costs of agricultural firms are operating costs (mostly salaries).

4.2 Comparison of KPIs of Agricultural and Non-agricultural Borrowers

4.2.1 Selecting KPIs

The KPIs to be evaluated need to meet the following basic requirements:

1. The KPI should adequately measure the performance of both agricultural and non-agricultural MSMEs.
2. The information needed to compute the KPI should be gathered during the loan assessment and captured in the MIS.

After assessing the data fields collected on loan application forms, Excel sheets and the MIS as well as the accuracy, reliability and completeness of the data captured in the MIS, it was ultimately concluded that Return on Assets of the businesses is the best and only indicator to compare business profitability across sectors (particularly agro vs. non-agro). This selection allows for the highest possible number of observations to be used in the analysis, ensuring the highest possible level of statistical accuracy of the results.

From an MFI perspective, performance of an enterprise is mainly measured by their ability to utilize loans and to pay them back. Thus, the borrower's likelihood to fall into arrears is selected as an additional KPI.

Other KPIs were considered but not recommended because data were not readily available in the MIS and, thus, quantitatively. These mainly include Return on Investment, Operating Self-Sufficiency, and Financial Self-Sufficiency.

4.2.2 Return on Assets as Key Performance Indicator

For the purpose of this study, RoA is defined as net income from business operations divided by total business and household assets:

- **Net business income:** The net income from business is calculated by deducting operating costs from the revenues earned by the firm. Other household income has not been considered as it is not linked to the analyzed business. Interest expenses of the firm, taxes and an owner's (fictitious) salary were not considered either in the calculation of net business income. It is worth mentioning that MFIs would typically compute the net income differently, i.e. including other household income and household expenses.
- **Total business and household assets:** ABM gathers asset data to cross-check the cash flow projections of the business and, more importantly, to list and value the collateral that the borrower can provide. In that exercise, loan officers do not distinguish between business assets and household assets. Thus, total assets (i.e. business and household assets) are used to compute RoA. These include cash reserves, receivables, already planted crops, inventory for sale, livestock, equipment & machinery, household assets and real estate. While real estate is only considered when it serves as collateral, the value of all other assets is considered regardless on whether it serves as collateral or not¹⁸.

Box 4: Defining RoA

$$\text{RoA} = \frac{\text{net business income}}{\text{total business and household assets}}$$

When comparing the RoA of non-agricultural firms with agricultural enterprises, the following issues should be considered:

- When accruing the data for crop farmers, the effect of the envisioned loan is considered, whereas it is not considered for other firms. Thus, the businesses of agricultural firms appear relatively larger than the assets of non-agricultural firms.
- The farmland of crop farmers is only part of the assets if it is registered or if it was bought or leased during the previous five years. The reason for that practice is that there is almost no market for farmland in Madagascar.

A series of alternative techniques of calculating RoA were applied, including utilizing a more conservative valuation technique of collateral (assets), and the inclusion of family expenses and/or other household income. A cross-correlation analysis has shown that these alternative techniques are all highly correlated to each other, and it is concluded that RoA, as defined above, can be used as a proxy for the performance of the business.

The table below compares the RoAs as defined above for the different types of firms. It reveals that non-agricultural firms use their assets considerably more efficiently than crop farmers and livestock farmers. On an average, the RoA for non-agricultural firms is 294%, while the RoA for crop and livestock farmers is only half as high (146% and 153%, respectively). Since the land of agricultural firms has typically not been considered in the assets, the RoA of agricultural firms is overestimated. It is interesting to note that other agro firms have the highest profitability, with RoA of 487%. In terms of RoA, SMEs are considerably less profitable.

¹⁸ Assets of other businesses in the same household (if applicable) are not considered. While the salary of family members living in the same household is not considered in the equation, their private assets are considered as household assets. However, since household assets are typically small in relation to business assets, we assume that this distortion can be neglected.

Table 5: RoA for agricultural and non-agricultural borrowers

Sector		RoA
Non-agro borrowers	Micro	296%
	SME	62%
	All non-agro	294%
Agro borrowers	Crop farmers	146%
	Livestock farmers	153%
	Warehouse	240%
	Other agro	487%
	All agro	263%
All borrowers		289%

4.2.3 Portfolio at Risk

The table below highlights the different repayment risks of non-agricultural and agricultural firms. It demonstrates that non-agricultural borrowers have a slightly higher risk of falling into arrears for a short period of time than crop farmers. Non-agricultural borrowers pose a considerably larger credit risk and cause higher provisioning costs to ABM as the PAR above 90 days of non-agricultural clients is three times as high as for agricultural borrowers.

Table 6: Portfolio quality for agricultural and non-agricultural borrowers

Sector		Overdue at least once
Non-agro borrowers	Micro	61.7%
	SME	59.3%
	All non-agro	61.6%
Agro borrowers	Crop farmers	55.3%
	Livestock farmers	59.1%
	Warehouse	40.3%
	Other agro	64.9%
	All agro	59.2%
All borrowers		61.2%

4.3 Determinants of RoA

A multiple regression analysis has been conducted to identify and quantify the determinants of RoA, the single most important KPI for the purpose of this study. Specifically, RoA is regressed on the type of business (crop, livestock, warehouse, other agricultural vs. non-agricultural) controlling for other variables¹⁹. These control

¹⁹ An Ordinary Least Squares (OLS) estimator has been used (see for example Stock/Watson 2014: Introduction to Econometrics). The statistical model applied is: $RoA_i = \alpha + \beta_1\{crop_i > 0\} + \beta_2\{livestock_i > 0\} + \beta_3\{warehouse_i > 0\} + \beta_4\{other\ agro_i > 0\} + \gamma X_i + \varepsilon$, where i refers to an individual borrower. The parameter β_1 {Agricultural >0 } indicates a binary variable that takes value 1 if the borrower is in the agricultural sector and 0 if otherwise. The parameters β_2-4 were generated the same way. Therefore, the parameters of interest are β_1-4 as it allows determining the difference in profitability between agricultural and non-agricultural borrowers. X_i is a vector of controls that is included in order to understand if the difference in profitability between these two groups is present even after conditioning for other possible profitability

variables were chosen from the variables that were available in the MIS of AccèsBanque Madagascar. Since some of them are used to compute RoA, a LASSO estimation has been conducted²⁰ to exclude those variables that mechanically contribute to explain RoA.

Control variables include age, gender, number of family members, year of disbursement, number of instalments, interest rate, loan purpose, client history (new vs. repeat client), year at which the enterprise started operating, sales, family expenses, collateral value, value of collateral granted, stock, fixed assets, advance payments to clients, repayment capacity, sector, branch, marital status. The table below reports the results of this regression analysis. The branch and marital status were included as binary variables. Some of the branches significantly influence RoA, but respective effects are not reported in the table below to limit the output to the essential.

determinants. ε is an error term that is assumed to be normally distributed. Linearity checks were conducted for all independent variable. The results, however, have not changed.

²⁰ The Lasso estimation (Least Absolute Shrinkage and Selection Operator) has been developed by Tibshirani (1996) and it is one possible solution for selecting variables in presence of many possible covariates. The main idea of this method is to minimize the residual sum of squares subject to the sum of the absolute value of the coefficients being less than a constant. Hence, a lasso penalty is introduced in the typical sum of squares minimization to deal with collinearity. The Lasso estimator would be as follows:

$$\hat{\beta}^{LASSO} = \underset{b}{\operatorname{argmin}} \left\{ \frac{1}{2n} \sum_{i=1}^n ROA_i - X_i b + \rho \sum_{j=1}^p |b_j| \right\}$$

Therefore, the LASSO estimation suggests which variables explain the biggest part of the variance of the RoA.

Table 7: Determinants of RoA

Independent variables	Coefficient	Robust standard error
Crop borrower	-2.686***	0.148
Warehouse borrower	-0.321*	0.17
Livestock borrower	-1.341***	0.0592
Other agro borrower	1.545***	0.192
Age	0.542***	0.189
Female	-0.0269***	0.00231
Number family members	0.250***	0.0538
Disbursed in 2011	0.0787***	0.0124
Disbursed in 2012	0.592**	0.29
Number of instalments	0.702**	0.292
Interest rate	-0.142***	0.0117
Reason: investment	0.101***	0.0135
Reason: investment + WCR	-0.728***	0.0794
Reason: other	-0.331***	0.0691
No new client	-0.786***	0.119
Year enterprise started	-0.974***	0.0544
Sales	-0.00790**	0.00342
Family expenses	-1.60E-09	1.13E-09
Collateral value	-3.98E-09	2.1E-08
Collateral granted	7.33E-09	9.98E-09
Stock	-5.57e-08**	2.41E-08
Fixed assets	-1.17e-07***	3.44E-08
Advanced payments to clients	-2.44e-08***	6.49E-09
Repayment capacity	-2.76E-08	0.00000011
Branch variables	yes	
Family status variables	yes	
Observations	59,461	
R-squared	0.129	
*** p<0.01, ** p<0.05, * p<0.1		

This model clearly suggests a significant negative effect of being a crop borrower, livestock borrower or warehouse borrower on RoA. Further regressions have revealed that the agricultural sector as a whole is significantly less profitable than the non-agricultural sector.

Further factors that significantly increase RoA of Madagascan entrepreneurs include age, a larger number of family members, loans that were disbursed in 2011 or 2012, a larger number of installments, being male, taking loans for investment purposes only, and a lower interest rate. On the contrary, the statistical model suggests that firms with the following characteristics have a significantly smaller RoA than their peers: firms with multiple loan purposes, repeat borrowers, tenure of the business, firms that provide advance payments to their clients. Sector and branch variables were partly significant.

As outlined above, the data were not collected for the purpose of this study. When considering the following effects (that cannot be quantified easily), it can be concluded that the difference between agricultural and non-agricultural borrowers is rather underestimated by the figures presented above:

- The land of agricultural firm is often not valued as there is no market for it. Including a fictitious land value would increase the farms' assets and, thus, decrease their RoA and further increase the difference to the higher RoA of non-agricultural firms.

- It can be assumed that farms have a higher labor input of family members than non-agricultural firms. If a fictitious salary was included, the RoA of farms would decrease more than the RoA of non-agricultural firms

Several alternative models (such as with added independent variables, with clustered standard errors, or with non-linear relationships) were computed. Essentially, they confirm the main results presented here. It is interesting to note that within non-agro borrowers, producers and service providers are significantly more profitable (in terms of RoA) than traders.

4.4 Analyzing the Efficiency of Smallholders' Farming Techniques in Madagascar

4.4.1 Methodology

In order to identify the potential of smallholder farmers to increase their efficiency by using modern production techniques, a field mission was undertaken to collect case studies of Malagasy farmers who are clients of ABM. For each case study the consultant analyzed the client loan file and visited the farm with the responsible Loan Officer. On-site, in-depth interviews were held with the farmers to learn more about their farming methods, financial behavior, and attitudes towards adopting new practices. The interview questionnaire and detailed findings from each interview can be found in Annex 4 and Annex 5 respectively.

4.4.2 Smallholder Farmers Use Largely Traditional Farming Techniques

All farm methods were traditional in the sense that farmers grew multiple crops (3 to 8), and cultivated paddy for self-consumption and usually sale. The table below presents an overview of these farms (full details presented in Annex 6).

Table 8 Overview of Client case Studies

Overview of Clients	Range	Median/dominating type
Rice Fields (hectares)	0.25-7	1.8
Other Areas Cultivated (hectares)	1-3	1.9
Primary source of revenue (50%+)	Paddy, tomatoes, onions, dairy farming	Paddy
Additional sources of revenue	Beans, onions, potatoes, carrots, corn, etc.	Beans
Farming Methods	Traditional, slight technological advances	Traditional
Farm performance (real)		
Profit Margin, all farming activities	57-80%	57%
Profit Margin, paddy	52-68%	58%
~Annual Net Revenues, all farming activities (EUR) ²¹	€860-4,400	€2,340
~Annual Net Revenues, paddy	€360-1,160	€970

The figures reflect the wide variations in land size, primary sources of revenues and paddy profit margins. This is due to the wide variety of farming conditions, practices and prices both between regions and within regions, as well as different fixed asset bases among the clients. The number of farms visited was not large enough to isolate

²¹ Calculated as annual net revenues before interest payments and family expenses, not counting additional sources of income. It is important to note that family expenses are essentially operating costs due to the participation of the family in crop cultivation. Annual revenues for the client are therefore lower in reality.

variables (soil type, input quality, planting methods) to that extent that meaningful conclusions can be drawn by comparing the performance (needed inputs and outputs, profit margins) of each farm to one another. However, the studies provide detail that can inform policy recommendations, as further explored in the remainder of this section.

Among the clients visited, all had access to high quality fertilizers, pesticides, and seeds. While most had the perception that prices were high for these inputs, they also perceived them to be of good quality and used at least one purchased input to improve their farming productivity. Usually this was fertilizer; almost no client purchased seeds, preferring to grow them himself from the previous year's crop. However, a closer look at the quantities of inputs applied, as well as conversations with Loan Officers, revealed that neither the amounts nor the methods of application of inputs were appropriate for the client's farming activity from an agricultural state-of-the-art's point of view.

4.4.3 Potential for Increase of Farmers' Profits

As previously mentioned, Madagascar has one of the lowest agricultural productivity levels in the world. To quantify the potential improvements a farmer could obtain by changing his methods, LFS compared the surveyed clients' median paddy production per hectare to the paddy quantities that can be produced when using optimal farming methods. The figures for optimal farming methods in the Malagasy context are derived from an agricultural index produced by Bevala, a Malagasy agricultural research center²². They are visible in Annex 8 in more detail, and are comparable to other agricultural institute guidelines produced around the world.

The table below displays this comparison²³. While the production cost per kilo of paddy hardly decreases, paddy production per hectare and, thus, net revenue per hectare can almost triple, when using the technology that Bevala has identified as the most efficient one.

Table 9 Cost per hectare of paddy production (EUR)

	Unit costs (EUR)	Case studies (median)	Case studies (mean)	Agricultural Index
Paddy per Hectare (kilo)		2,378	2,516	6,500
Costs of man days per hectare in Euro	0.87	104	112	174
Costs of man days with zebu per hectare in Euro	1.74	21	21	-
Costs of seeds per hectare in Euro	0.23	-	4.95*	0.12
Costs of fertilizer (Uree) per hectare in Euro	0.57	-	1.8	39.59
Costs of fertilizer (NPK) per hectare in Euro	0.58	-	3.4	174
Costs of organic fertilizer per hectare in Euro	2.03	-	0.00	-
Costs of Insecticide per harvest per hectare in Euro	4.83	-	0.97	2.42
Additional costs	-	-	2.78	-
Total costs per hectare in Euro	-	131	147.22	390
Total costs per kilo of paddy in Euro	-	0.07	0.06	0.06

²² More information on Bevala available at: <https://cfpbevalala.wordpress.com> (31.03.2017).

²³ The table uses the actual input and output amounts of each farmer for his primary rice harvest, multiplied by the median unit costs and prices found among the case studies. Details are available in Annex 7. As such, the financial figures are comparable but not actual. Actual figures for the annual paddy revenues of each farmer can be seen in Annex 6.

	Unit costs (EUR)	Case studies (median)	Case studies (mean)	Agricultural Index
* Only one farmer purchased seeds. He needed around 200 times more seeds per ha as the agricultural index suggested as he had no machine/skills to distribute the seeds efficiently.				

Table 10 Net revenues per hectare of paddy production (EUR)

	Unit price	Case studies (median)	Case studies (mean)	Agricultural Index
Revenue per hectare	0.20/ha	466	493	1272
Operating costs per ha		131	147	390
Net revenues (EUR)		302	345	882

For smallholder farmers, a change to best practice methods therefore offers a great opportunity to increase earnings, but is accompanied by a much greater financial risk as they would require credit or own funds to finance the higher operating costs. In addition, it should be noted that these figures do not account for the *cost of the loan* that would be needed to finance these additional operating costs, and which would decrease the multiplier seen in net revenues. It is unlikely that smallholder farmers will be able to achieve the full productivity levels suggested by the agricultural index. Likewise, it cannot be assumed (and most probably not be advised) that farmers take the full risks that the adoption of the agricultural index farming techniques would imply. However, the case studies presented here clearly outline that there is a very high unused potential for smallholder farmers to increase their revenues by applying different techniques. Before respective extension services can be implemented, more research should be done to define and test the types of methods together with the farmers.

4.4.4 Additional Findings

Among the case studies, all clients stated that they would be interested to receive extension services to improve their farming methods, whether for paddy or for other crops. Three of the seven interviewed had previously received extension services, either from the government (for paddy production) or from a private organization²⁴ (for fruit production). Even if the farmers could not quantify the effects of these interventions during the interviews, they perceived them as beneficial to their farms.

In addition it was found that:

- Three of the five had applied for a larger loan than the one granted to them by ABM, but were denied due to their limited repayment capacity.
- The purpose of the loan was generally working capital to finance the next harvest season. In addition, all clients stated that they planned to invest further in their farm, either through the purchase of light machinery or oxen (to lower operating costs) or to purchase additional land.
- No clients interviewed had ever heard of insurance.
- In addition to the crop farmers discussed above, two chicken farmers were visited. These clients have microloans (rather than agricultural loans) and face different cost structures and risks than agricultural loan clients. While such clients could benefit from insurance services, they do not have the vast potential to increase earnings seen among crop farmers. Some potential improvements in the applied technology do exist; these particularly relate to access to water and an increase in the scale of operations.

²⁴ More information on Agrisud available at: <http://www.agrisud.org/en> (31.03.2017).

Table 11 Effective annual interest rates and loan ranges among FIs

Product Type (sub-categories have been combined)		ACCESBANQUE	MICROCRED	Adéfi-ACEP	SIPEM	PAMF	OTIV	CECAM
Micro loans- average duration 12 months	min amount	500,000.00	200,000.00	200,000.00	200,000.00	100,000.00	100,000	200,000.00
	Max EAIR	64%	79%	44%	67%	39%	74%	71%
	max amount	20,000,000.00	20,000,000.00	16,500,000	20,000,000.00	20,000,000.00	1,000,000.00	6,000,000.00
	Min EAIR	52%	63%	44%	59%	42%	74%	61%
SME loans- average duration 12 months	min amount	20,000,001	20,000,001	16,500,000	20,000,000.00	20,000,000.00	60,000	
	EAIR	50%	60%	44%	52%	37%	97%	
	max amount	100,000,000	200,000,000	120,000,000	40,000,000.00	40,000,000.00	1,000,000	
	EAIR	33%	58%	40%	34%	37%	97%	
Agricultural loans: Working capital- average duration 12 months	min amount	400,000.00						
	EAIR	87%					50%	47%
	max amount	15,000,000.00					1,500,000.00	4,000,000.00
	EAIR	59%					50%	47%
Agricultural loans: crop storage- estimated at both 6 and 9 months	min amount	550,000.00	1,000,000.00			600,000.00	550000	550000
	EAIR	58%	58%			25%	45%	49%
	max amount	20,000,000.00	200,000,000.00			20,000,000.00	not given-ASK	40,000,000.00
	EAIR	45%	45%			24%	39%	44%

4.5 Do KPIs or Their Explanatory Variables Affect Credit Access?

ABM limits access to its products to enterprises that are inside the zones that a branch can cover. It delivers its products through 26 branches, and each branch serves clients in a radius of around 25km. The credit technology of ABM requires loan officers to visit the farms to assess the creditworthiness of the borrower on-site, and to conduct regular follow-up visits to ensure the proper use of funds and timely repayment by having close contact to clients. This is linked to high transaction costs (particularly staff time and direct costs linked to transport). In order to do payments and to withdraw cash, clients have to travel to the nearest branch. Depending on the distance, respective travel costs (direct costs and opportunity costs of time) can be a significant portion of the total loan costs. Thus, ABM believes that the single most important factor that limits access to finance of agricultural clients is the high transaction cost that is caused by the physical distance to the branch. Consequently, the bank currently conducts a feasibility study to analyze the costs, benefits and risks involved with implementing alternative and less costly delivery channels than branches (such as agent banking systems).

Relevant quantitative data on non-borrowers are not available in the MIS of ABM. To explore whether ABM agricultural customers have less access to finance than ABM non-agricultural borrowers, it is thus necessary to identify proxies that can be used to operationalize credit access. The following proxies were identified:

A few proxies were used to operationalize credit access, including:

- Loan size (while controlling for business size)
- Difference between demanded and disbursed loan amount. Assuming that both agricultural and non-agricultural entrepreneurs request for the loan amount they actually believe to need for their business and from which they believe they can repay it, the difference between requested and disbursed loan amount may indicate restricted access to finance. Experience has shown that customers typically request for somewhat higher loan amounts because they think that the FI reduces this amount. When using the difference in the two amounts as a proxy for access to finance, it is assumed that these borrower practices are randomly distributed between non-agricultural and agricultural clients.
- Time needed between loan application and disbursement: Easy access to finance can be operationalized by the time loan applicants wait for their disbursement. However, this proxy only measures the ease of access for those that have access altogether.

Regression analyses are employed to uncover the determinants of credit access (see Annex 3). Results suggest that:

- An initially significant negative effect of being an agricultural firm on the loan size disappears when controlling for variables that reflect the business size, i.e. no significant link between being an agricultural firm and loan size could be found.
- There is a significant effect between the difference in applied and granted loan amount on the one hand, and being an agricultural firm on the other hand: The difference between applied and granted amount is higher for agricultural firms. The regression analysis in Annex 1 estimates that the difference amounts to EUR 102.

- Agricultural clients wait significantly longer for their loan disbursement than non-agricultural borrowers (see Annex 1). Due to the above mentioned distance between branches and rural areas, this result is not surprising.
- No meaningful results were obtained when using RoA as determinant of credit access.

The available quantitative data could thus not provide any meaningful insights to explain access to credit. This is linked to the fact that credit access could only be operationalized indirectly since no quantitative data were available for rejected loan applicants nor for those with businesses outside the branch operational zones. However, ABM has clearly spelled out that access to credit is mostly restricted by the prohibitively high transaction costs associated with loan officers travelling to clients and clients travelling to branches. With its current technology, ABM has no plans to expand the operational radius around its branches due to these costs.

4.6 Relative Size of Repayment Obligations is Higher for Agricultural Firms

MSME borrowers (both, agro and non-agro) tend to overestimate their capacity to repay loans. To avoid borrower over-indebtedness and arrears, ABM puts a lot of efforts in gathering reliable data from its potential borrowers to calculate the “debt service ratio”, i.e. the debt payments (principle amount plus interest) divided by the net household income (i.e. income of the business and household less costs of the business and household).

In the experience of LFS, borrowers are adequately financed if the debt service ratio is between 50% and 70%, and are likely to face financial problems if this benchmark is exceeded. Consequently, ABM puts respective limits into its credit policy.

At AccèsBanque Madagascar, the debt service ratio for agricultural borrowers has a mean of 48%, the ratio for non-agricultural borrowers is 51% on an average. Although the difference is statistically significant (t-test), it is so small that it can be neglected.

The relative repayment obligation of agricultural borrowers is considerably and significantly higher ($p < 0.001$, t-test) when it is compared to business income, total household (i.e. business and other) income and total household expenses. The table below quantifies respective ratios. It should be noted that the difference between the repayment obligation of agricultural firms and non-agricultural firms is even higher in practice if it is considered that the expected proceeds of the loan are considered for agricultural businesses, but not for non-agricultural businesses.

Table 12: Relative share of repayment obligation

Relative share of repayment obligations	Crop farmers	All agro borrowers	Non-agro borrowers (mean)
Repayment obligation / gross business income	28%	18%	10%
Repayment obligation / (gross business + other household income)	23%	15%	8%
Repayment obligation / business expenses	91%	62%	117%
Repayment obligation / (business expenses + household expenses)	52%	30%	14%
Repayment obligation / available business income net of business and family expenses (“Debt service ratio”)	82%	48%	52%

The fact that the relative share of repayment obligations is consistently (and mostly significantly) higher for crop farmers suggests that farmers with access to credit are relatively well funded. One could argue that farmers with loans of AccèsBanque would be at risk to become over-indebted if their relative repayment obligations increased considerably further. The credit risk would become prohibitive if ABM’s crop farmers received more funding. The figures do not suggest that crop farmers “sacrifice more” to the loan repayment as long as they actually use the borrowed amount to invest into their farm. However, it makes the borrower (and thus also the lender) more vulnerable to any impacts to the farm. In case the farmer faces any difficulties in earning the expected income, he is less likely to be able to reduce non-loan related expenses if the repayment obligation is higher.

Thus, the analysis of the relative share of repayment obligation does not suggest that farmers with access to loans are discriminated against by ABM.

4.7 Assessment of Adequacy of Financing Conditions

This section attempts to assess the adequacy of financing conditions offered by the MFIs to crop farmers and non-agricultural borrowers taking into account their RoA, repayment capacity, repayment risks as well as an estimate of the cost of lending. The table below summarizes relevant key findings of the previous sections.

Table 13: Assessing the adequacy of financing conditions

Indicator	Crop farmers and warehouse loans	Non-agro borrowers
RoA	146%	294%
Repayment obligation/ business and household expenses	52%	14%
Portfolio quality (proportion of overdue clients with > 90 days arrears)	1.2%	3.6%
Effective annual interest rate	45% - 87%	33% - 64%
Gross portfolio yield	54%	33% (SME) – 44% (micro)
Revenues-to-expense ratio	117%	135% (SME) – 150% (micro)
Profit-to-expense ratio	11%	32% (SME) - 45% (micro)

Crop farmers have a lower RoA, i.e. they use their assets less efficiently than non-agricultural firms. This strongly indicates that the return on investment of agricultural businesses is also smaller than the one of non-agricultural firms, i.e. agricultural firms can leverage on loans less than non-agricultural firms. The difference in profitability is increased if the firms take loans, because agricultural loans tend to be higher priced than non-agricultural loans. Thus, from an entrepreneur’s point of view crop cultivation is less profitable than getting engaged in other activities both, because of the lower asset efficiency and the higher cost of funds. This is exacerbated by the fact that transaction costs linked to the loan (especially transport costs to FI branches) are considerably higher in rural areas than in urban ones. This does not mean that crop farmers do not benefit from loans; it only means that non-agricultural borrowers benefit more from them.

From a supply side perspective, the cost of lending to crop farmers is considerably higher than for non-agricultural firms. The lower repayment risk of crop farmers (as calculated from past performance) as well as the higher interest charged to them cannot fully compensate for the higher overall costs, making the agricultural loan product less profitable for ABM than its other products. It should be noted that larger regional or even country-

wide risks (e.g. weather, natural disasters to which agro firms are more vulnerable than non-agro firms) inherent to agricultural finance are not even considered in the assessment as these have not occurred to the clientele in the analyzed data. Nevertheless, the product, in its current form, positively contributes to the profitability of the bank.

It can be concluded that the higher interest rates to crop farmers are not a result of the lower market penetration in rural areas, but of the higher transaction costs. Considering the situation of agricultural firms as well as the situation of ABM, the financing conditions can be concluded to be fair. They could be improved considerably for both market and supply side, if transaction costs could be reduced by the implementation of more efficient delivery channels.

5 Promotional Instruments in Agricultural Finance

5.1 Types of Promotional Instruments

A variety of promotional instruments are available, as depicted in the figure below and described in more detail in Annex 12. Figure 5 presents considerations specific to agricultural finance that should be kept in mind when considering such instruments.

Figure 5: Types of promotional instruments

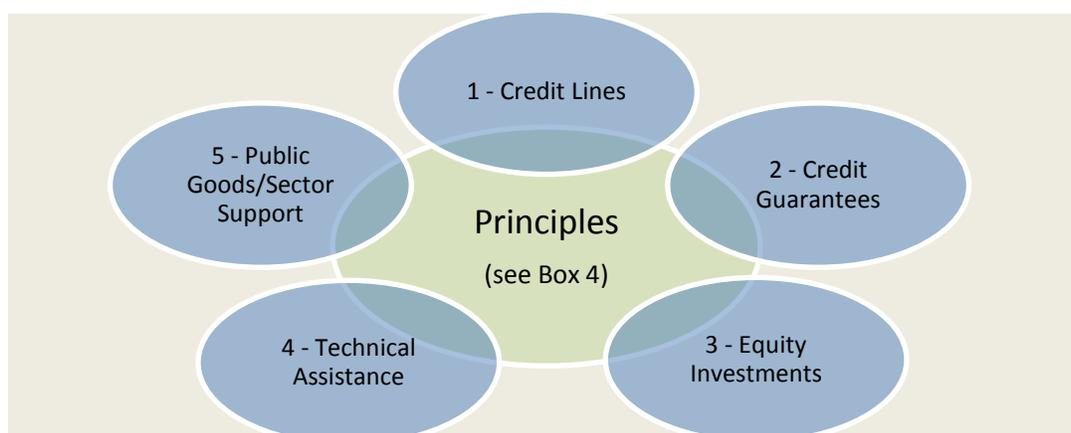


Table 14: Financial sector support instruments

	A – Financial sector	B – Financial Institution	C – Client
Support type	Support that is directed at the sector and NOT to a FI.	Support for individual FIs, which is either placed directly at the FI, or channeled through a sector agency.²⁵	Support directed at and impacting the client
Examples	<ul style="list-style-type: none"> • Building an apex facility that provides lines of credit • Credit registry • Technical assistance fund • Policy dialogue to integrated sector policies, or about certain financial instruments • Regulation (e.g. non-banking agents, index insurance) 	<ul style="list-style-type: none"> • Credit line • Equity investment • Credit Guarantee • Technical assistance as <ol style="list-style-type: none"> a) matching grant for physical investments; b) capacity building/training c) coaching for product development or other improvements; d) process advise for partnerships with aggregators or service providers 	<ul style="list-style-type: none"> • Financial education by workshops, study circles • Credit-plus services to improve borrowing capacity • Subsidizing transaction costs • Facilitating payment services • More diverse product offer

²⁵ A single or multiple FIs can be addressed, the latter by including an agent, such as a commercial bank, an apex bank, a fund, a training institute or an association.

Table 15: Non-financial support strategies

	Policy environment	Extension agents	Farmer or farmer organizations
Support in the non-financial sector	<ul style="list-style-type: none"> • Capacity building for the Agricultural Ministry • Integration of national strategies and action plans (finance, agriculture and others, such as climate change, green development) • Developing systems to collect weather and area yield data 	<ul style="list-style-type: none"> • Linking the FI with an extension service provider (government or private) • Grant for financial support of extension services (PPP, NGOs) • Developing farmer organizations 	<ul style="list-style-type: none"> • Business planning • Knowledge about new technologies / training for smallholders²⁶ • Cash grants for smallholders to co-fund projects of borrowers²⁷ • IT-technologies: e.g. using the mobile phone for payments or loan tracking, or market data • Improving agricultural production by new technologies • Marketing support • Better inputs and fertilizer

Box 5: Principles for promotional instruments in agricultural finance

In the last decade, a **modern financial systems development approach** has been the dominant approach to financing smallholders in developing countries and emerging markets. Major financial sector promoters such as KfW, BMZ, GIZ, CGAP, FAO, IFAD, the World Bank and MfW4A have developed **principles and guidance on smart subsidies** intending to make sure agricultural finance promotion creates sustainable impact and has no distorting effects. For the purpose of this study, the following principles on financial sector development are relevant:

- FIs should charge **cost covering interest** rates.
- Farmers need **quick access to loans**; this is more important than the cost of loans.
- Farmers require a **diversified range of financial services**: credit, savings, insurance, and payment services.
- Encourage **longer term productivity-enhancing on-farm investments**.
- **Improve public goods** such as financial literacy, consumer protection and farmer business education.

Relevant guidelines on smart subsidies:

- Subsidies to **finance innovations** created through networks of financial institutions may be preferred because the benefits will be spread among all members.
- **Indirect subsidies** that benefit many borrowers, e.g. by building financial infrastructure, may generate more total benefits than direct interest-rate subsidies to borrowers.
- **Interest subsidies outside the financial sector**, e.g. investment grants, can help to lower the interest burden for investment loans.
- **Subsidizing the institution** but not the borrower is the best way to reduce distortions even if this implies a degree of direct subsidy to borrowers.
- Subsidies for **institution-building** of individual financial institutions are easier to justify if there is a natural positive spill-over to non-subsidized institutions.
- Subsidies need to be time-bound with explicit **exit strategies**.

²⁶ See Bolivian irrigation project in Annex 1, List of References.

²⁷ See IFAD project, Madagascar, in Annex 1, List of References.

-
- Subsidies to selected FIs should explicitly consider the interest rates to be charged relative to competing FIs so the **subsidies do not undermine competition**.
 - Recipients of grants should provide **matching cash** or in-kind contributions to demonstrate their commitment to the projects funded.

Source: Adapted from G20 Synthesis Report “New trends in Agricultural Finance” (2015); Kampala Principles for Agricultural Finance (2011), “Subsidies as Instrument in Agricultural Finance” (CABFIN 2011); and “Support for farmers in developing and emerging countries” (KfW 2015).

5.2 Recent Insights about Promoting Agricultural Finance and Development

The relevance of the agricultural sector and especially smallholder farmers has increased in the past decade, with a number of important policy agendas relying on its development. Among those are food-security (responding to a growing world population), mitigation of the effects of climate change (responding to the increasing number and severity of catastrophes) and income generation in rural areas (responding to increasing urbanization). This has pushed global actors such as the G20, development banks across the globe, and private companies to engage more deeply in researching and promoting agricultural finance. We conducted a **literature review to extract recent insights** regarding innovative approaches to promoting agricultural finance and developing smallholder farmers’ businesses.²⁸ The following insights add to the general support instruments as described above. We take the two perspectives (i) bank level and financial services, and (ii) the non-financial side of agricultural development.

Bank level and financial services

Digital technology is a potential game changer supporting product innovation (e-warehousing, savings linked to input purchases, or index insurance); distribution, payments and supporting market information. Such technologies can help lowering transaction costs for both the client and the FI. Of particular importance are digital payment solutions and obtaining relevant market information.

Challenges related to banking business need to be dealt with, such as limited access to long-term funding, competing priorities in higher financial yield areas, higher transaction costs than in urban areas and barriers in the policy and regulatory environment.

Farmer segmentation enables bankers to look at the sub-sets of farmers and locate specific growth opportunities. Subsistence farmers and semi-commercial smallholder farmers own less than 2 ha of land in many SSA countries. The latter group can be included in a value chain approach. Subsistence farmers may draw income from outside the farm. Segmentation allows picking the “low hanging fruits” and, later, offering an adequate mix of various financial services as they grow.

Smallholders require a range of financial services apart from credit. Savings products are often overlooked in smallholder financing. Payments via non-banking agents, mobile phones, or electronic vouchers can considerably reduce transaction costs for farmers and their families. Some smallholders rather need digital payments services and digital deposit services than more credit.

²⁸ “New trends in Agricultural Finance”, Synthesis Report of the G20 and their Global Platform for Financial Inclusion (GPII) (October 2015); IFAD (2012), Agricultural value chain finance strategy and design; Ergon Associates (2009), Review of global activities to promote ‘decent work’ in agriculture; GFPI and IFC (2012), Innovative Agricultural SME Finance Models.

Mitigation of risks by insurance can enable the FI to increase their reach to more farmers. Insurance can reduce the negative impacts of shocks affecting the life, health, family and business of the farmer.

First loss guarantees can help mobilize credit for agricultural smallholders as they help to establish a level of trust. They can either come from a government scheme, or private player (bank managed guarantee facility). However, success of guarantees can only be judged over time as in many cases, their financial sustainability still has to be proven.

Value chain finance (VCF)²⁹ is a key ingredient for growth and scale and needs to consider the full spectrum of stakeholders, provide market and technical information and support the capacity of VC actors. VCF is always finance+ (research, extension, information and communication technology, and insurance).

Non-financial support to agricultural sector development

Extension support adds value to finance and improves yield and incomes. Financing agriculture is more effective when it is part of a broader package that combines both financial and non-financial services to the farmers through access to better inputs and extension, while also ensuring access to markets.

For technological improvements at farm level, financing can become the catalyst along specific value chains. Furthermore, promoting the adoption of new technologies to make sure they are culturally accepted and understood is required to enable farmers to increase yields and improve quality of crops.

Risk sharing strategies beyond finance can rely on value chains, local knowledge and producer organizations. Preventive risk management can also protect farmers from severe losses due to the effects of catastrophes.

Non-agricultural income for small-holders can be more important than agricultural related income.

Access to markets and interactions with local traders of inputs and outputs are important factors in the financial lives of smallholder farmers.

Producer organizations can be important aggregators for delivering financial services. They may also be good customers for loans if they are legally registered, have written records and can demonstrate strong relationships with input firms and/or buyers.³⁰ Support strategies such as “capacity building” and “matching grants” imply that a certain organizational level of farmer organizations is in place.

Leveraging public support for smallholder farmers’ development can be done by public private partnerships, which allows governments to leverage private sector funding in areas such as warehouse facilities, irrigation or processing. Government extension services have a more lasting impact where finance is also available.

²⁹ Value chain finance promotes financial services and products flowing to and/or through value chain participants to address and alleviate constraints to growth. Value chain actors are private and public entities, including service providers who engage in a sequence of value-adding activities involved in bringing a product from production to the end-consumer. In agriculture, they can be thought of as a “farm-to-fork” set of inputs, processes and flows. From IFAD (2012), Agricultural value chain finance strategy and design.

³⁰ IFC Handbook (2013) “Working with Smallholders”.

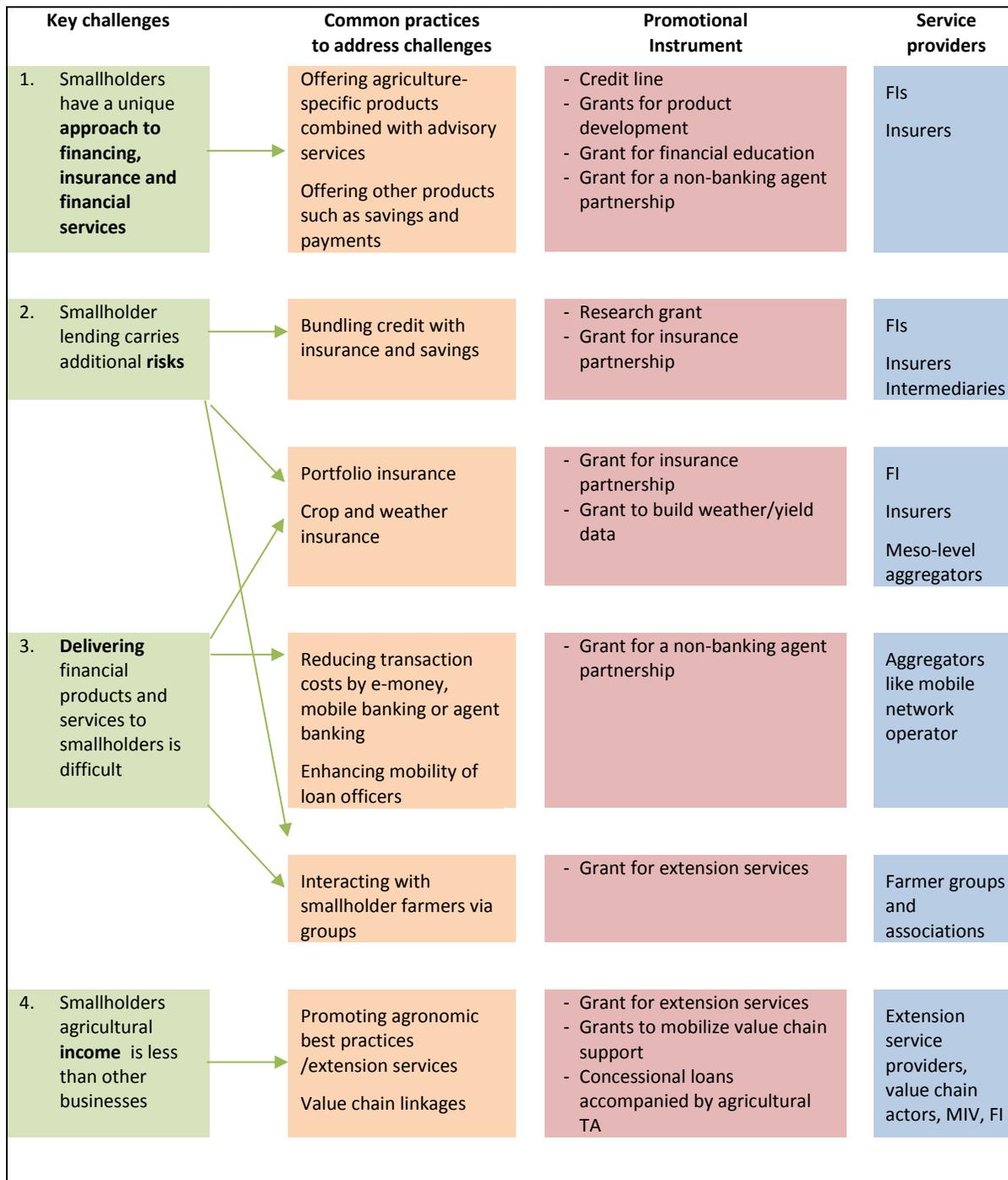
5.3 Addressing Challenges in Agricultural Finance in Madagascar

This chapter takes the perspective of the challenges in smallholder finance, based on the case of Madagascar.

Analyzing current challenges and practices in financing smallholder farmers deserves a closer look at the characteristics of this customer group. We will start looking at each challenge from a client perspective, elaborate on how the common practices to promote smallholder finance have been dealt with, and which service provider is involved. The following figure presents the challenges in agricultural finance, commonly applied practices and service providers.³¹ It is applicable to Madagascar.

³¹ Point #3 on figure: Adapted from Dalberg with author's additions to accommodate the case of Madagascar, promotional instruments and service providers.

Figure 6: Challenges in agricultural finance, commonly applied practices and service providers



5.3.1 Addressing Key Challenge 1

Farmers have a unique approach to financing, insurance and financial services.

Smallholder farmers have a unique approach to financing, insurance and financial services, especially when compared to other client groups such as urban clients, employed persons, or larger agricultural businesses. They can be characterized as follows:

- Their cash flows are cyclical and income stream pattern don't match their regular spending needs.
- Smallholders' level of awareness of financial services, financial literacy and capability to use financial services is generally low. This awareness level includes loans, but awareness is especially low in the areas of financial savings, insurance and mobile banking.
- Some think they are "too poor to save". Savings services are often offered through group savings. Savings in kind are still very common due to the lack of saving facilities, and cultural reluctance.³²
- They use traditional risk mitigation means, such as reserving rice for emergencies, selling animals or community contributions to funerals. Awareness of and capability to use and access formal insurance services are very seldom found. Such services are often in place only if an externally supported pilot program is close by.
- Payments are often still made in cash, especially in remote areas. Only in exceptional cases do smallholders have access to electronic payments or mobile wallets. These instruments are slowly increasing. However, they are concentrated in a few countries and not yet broadly accessible.

Common practices to address the challenges, promotional instruments and service providers

These challenges can be addressed by:

- Offering agriculture-specific products (such as value chain finance, concessional loans to promote the agricultural sector as a whole or that address more specific limits of growth such as lack of fixed asset investments).
- Offering other products such as insurance, savings and payments. **Product diversity can be improved by client segmentation at a more granular level, e.g. by segmenting women, small and micro enterprises, youth and children, different types of farmers, and other businesses³³.**

Relevant promotional instruments are typically delivered by FIs and/or insurers and include:

- Credit lines
- Grants for product development
- Grants for financial education
- Grants for a non-banking agent partnership

Specifics in Madagascar

What are the particular financial needs of ABM clients/smallholder farmers in Madagascar?

- ABM clients access small agricultural loans mainly for working capital and not for investments (purchase of machinery or land). They could be interested to borrow longer-term credit if they would find good investment

³² Microfinance business is still often credit-driven. However, a modern approach to savings mobilization is emerging. See for example: GSMA (2015), Savings groups, a rural sales channel for mobile money in Africa.

³³ Care and Accenture (2015), Within Reach.

opportunities such as purchasing machinery. However, smallholders in Madagascar lack significant amounts of qualified demand beyond the loans they receive at present, due to the fact that most are uninterested in using the modern farming techniques discussed previously. (It is possible that such demand could be stimulated via extension services/farmer education and/or with a successful demonstration case.)

- Investment opportunities, both in agriculture as well as in non-agriculture, are limited.
- They seem to be satisfied with the cost of agricultural credit. However, the interest burden for agro clients is significantly higher than for urban or non-agricultural clients because their profitability is much lower (see above). In addition, many clients applied for a larger agricultural credit but were granted a smaller amount because of their repayment capacity.
- They prefer to save with other local financial services providers (e.g. the cooperatives who offer a pass book), they save in-kind (jewelry) or invest into their business (rice to speculate on rising prices, animals, sometimes more land).
- They don't know what insurance is nor has such a product been offered to them.³⁴
- They are not used to using e-banking or agent banking services, as this has not been previously offered.

ABM has been addressing these challenges by developing a lending technology that suits the smallholder farmers and their businesses; it has developed loan products that are tailored to the agricultural sector, via the 'agricultural loan' (includes an analysis of the farmer's cultivated area, farming methods, crop yields and monthly sales), and the 'storage loan'. ABM's agricultural loan officers are able to lend effectively to smallholder farmers, because they (a) are hired for their existing agricultural knowledge, and (b) receive tailored training on best practices and on the specific region where they will be working.

5.3.2 Addressing Key Challenge 2

Smallholder lending carries additional risks

Financial institutions serving smallholders face multiple risks and challenges associated with agricultural production and lending.³⁵

- Smallholders have a **personal risk**. They run the business as a family business; however, the farmer is the major breadwinner. If he or she, or one family member suffers from a health event, has an accident or passes away, the business can easily be in jeopardy.
- Smallholders are vulnerable to **systemic risks**, namely weather events such as flooding or drought, or other risks such as crop or livestock disease, which can drastically reduce their income and hence, their ability to repay loans.
- Most also lack strong and consistent buyer relationships, which contributes to **price risk** when selling their surplus, which can further jeopardize their repayment ability.³⁶
- They often lack the **credit history and collateral** to support a loan assessment.

³⁴ A rapid client survey implemented for this project revealed that none of the seven interviewed have heard of insurance. From the small sample of seven clients one cannot generalize to all clients, but it can be extrapolated that the majority of clients have never been in touch with formally provided insurance.

³⁵ IFC (2014), Access to Finance for Smallholder Farmers.

³⁶ Dalberg Initiative for smallholder finance (2014), "Lending a hand: How direct-to-farmer finance providers reach smallholders", Briefing Note 6.

Common practices to address the challenges, promotional instruments and service providers

Common practices to address these challenges include:

- Bundling credit with insurance and savings: Research grants and grants for insurance partnerships could be tools for FIs and insurers to elaborate and design effective partnerships;
- Implementing portfolio insurance and crop and weather insurance: FI, insurers and meso-level aggregators could team up to offer respective products. Grants for insurance partnerships and grants to build weather/yield data could initiate and stipulate the design and implementation of respective products.
- To mitigate these risks, stakeholders could interact with smallholder farmers, e.g. via groups. Grants for relevant extension services would stipulate such interactions. Relevant stakeholders are farmer groups and associations.

Specifics in Madagascar

Which are the specific risks that smallholder farmers in Madagascar are facing?

- In ABM's business area, there are no indications of immediate threat of systemic risks such as drought or flooding.³⁷ However, annual monsoons and variations in rainfall have a strong impact on the yield of cultivated areas.
- As a staple of the national diet, almost all farmers cultivate paddy for self-consumption and (sometimes) sale. However, rice prices are determined by the international market and are largely unpredictable. While some mechanisms, such as storage loan, exist to mitigate this risk, most farmers are nonetheless exposed to potentially significant shocks on their revenues.
- Smallholders have very limited knowledge about proper use of inputs (fertilizers, industrial seeds, pesticides). As a result, inputs are applied in improper levels, in the best case leading to low yields but in the worst case leading to damage to the soil.

What could be done to mitigate these risks?

- Introduce credit life insurance.
- Purchase portfolio insurance
- Act as agent for an insurance company to sell insurance policies to their clients.

However, we do not explore such instruments further in this report as it is outside the intended scope and focus, and sufficiently addressed in other research channels.

5.3.3 Addressing Key Challenge 3

Delivering financial products and services to smallholders is difficult

Delivering financial products and services to smallholders is difficult and more costly than serving urban clients. A low population density as well as infrastructure constraints, such as lack of roads, electricity and connectivity, contribute to higher operating costs.

Transaction costs for lending and repayments are relatively high. Agricultural firms wait longer to receive a loan and receive relatively less (compared to amount requested) than non-agricultural firms. In addition, many farmers spend approximately ½ day per month for traveling to the branch.

³⁷ Internal agricultural insurance study, confidential.

Finding adequate **bank staff** – trained in finance and agriculture - in or for rural areas is another challenge. Some banks compensate for this by offering higher compensation packages to recruits to entice them to move to rural areas.

FIs in Africa are striving to **reduce the high bank's transition costs for reaching out to the smallholder farmer**, often via technology.

Common practices to address the challenges, promotional instruments and service providers

Generally, these challenges can be addressed by:

- Implementing portfolio insurance and crop and weather insurance: FI, insurers and meso-level aggregators could team up to offer respective products. Grants for insurance partnerships and grants to build weather/yield data could initiate and stipulate the design and implementation of respective products.
- The probably most important tool to reduce transaction costs and, thus, increase accessibility, is the introduction of e-money, mobile banking or agent banking into rural areas. Grants for a non-banking agent partnership could specifically help facilitating the development and implementation of such systems. Key stakeholders are FIs and aggregators like mobile network operators.
- To mitigate these difficulties, stakeholders could interact with smallholder farmers, e.g. via groups. Grants for relevant extension services would stipulate such interactions. Relevant stakeholders are farmer groups and associations.

Specifics in Madagascar

Which are the challenges to serving smallholder farmers in Madagascar?

- ABM serves clients in a radius of 25 km of the branch. ABM client farmers report that they need up to half a day for traveling to the branch (which they do once per month). The associated transaction costs are a high burden for farmers, which results in time they could spend for productive use and money for transport.
- The same is valid for the supply side. The main constraint faced by ABM in serving rural clients is the high transaction costs for the FIs. Specifically, transport costs for traveling to clients are still prohibitive for ABM, which both limits the areas served as well as rendering the segment the least profitable for the bank.

What has ABM Bank done related to these challenges?

- ABM has been preparing an agent banking project, recognizing that clients would considerably benefit from close low-cost channels such as agent banking. The pilot project will be rolled out in 2016.
- Agricultural Loan Officers are all equipped with motorbikes (unlike urban LOs) to be able to access difficult-to-reach clients.

5.3.4 Addressing Key Challenge 4

Smallholders agricultural income is lower than from other business

Smallholder farmers show a lower level of profitability compared to non-agricultural firms. The study shows that agricultural firms are considerably and significantly less profitable than non-agricultural firms. The RoA for agricultural firms is around half of that of non-agricultural businesses. The low profitability of farmers is largely linked to the lack of skills and the basic technology farmers are using, such as the very limited use of fertilizers, their reliance on traditional crop varieties, or their lack of access to bulls or small tractors to draw ploughs.

This in turn limits the borrowing potential and the potential for ABM to expand lending business. The high dependence of smallholders on farming for survival makes many risk-conservative, which in turn makes them

reluctant to try new technologies and new crop varieties. Reluctance can also be expected towards newly offered financial services, for example, out of several interviewed small farmers, none of them knew the concept of insurance, nor had they ever had insurance.

Smallholders have a relatively high burden for servicing loans compared to non-agricultural borrowers. The relative share of repayment obligations on income and cost variables is considerably and statistically significantly higher for agricultural borrowers than for non-agricultural borrowers. Repayment obligations stress agricultural borrowers' finances more than non-agricultural borrowers and, at least for borrowers of ABM, further increasing their repayment obligations may lead to client over-indebtedness and increased credit risk.

Improving the borrowing capacity requires investments in productivity enhancing technology. The use of even simple technology by farmers has the potential to increase their KPIs. Special credit lines to finance fixed assets (such as cows, small tractors) or fertilizer could help farmers increase their profitability. However, such credit lines need to be accompanied by intensive training for farmers to ensure the money is correctly invested, and that loans have a well-controlled credit risk. An adequate promotional instrument would be concessionary loans for these purposes, accompanied by TA grants for intensive training of farmers.

In Madagascar, farmer organizations are almost non-existent. ABM may also look at creative ways to develop partnerships that can increase outreach to rural clients. Nevertheless, farmer-based organizations can play a role in strengthening supply chains and creating opportunities for financial institutions to expand services to farmers if given appropriate technical assistance³⁸.

Expanding the client base to the entire agricultural value-chain would require addressing the financing needs of a more diverse set of farmers and rural entrepreneurs that are directly or indirectly related to agricultural value chains.

Value chain finance also has the potential to increase FI efficiency in the information gathering process and, thus, to improve outreach to agricultural firms. Value chain finance is barely existent in Madagascar because value chains are not defined. To promote agricultural value chain finance, an effective instrument would be to assist setting up the respective infrastructure by defining value chains. Once such value chains have been established, FIs can utilize them to design respective products to increase outreach while decreasing information costs and controlling risks efficiently.

Common practices to address the challenges, promotional instruments and service providers

The following means could be employed to address these challenges:

- Promoting agronomic best practices through extension services could be facilitated by respective grants. To ensure that farmers have the financial means to implement identified best practices, these extension services should be linked to the provision of concessional loans for farmers. Both, FI and Extension service providers play key roles in this.
- The definition and use of value chains would facilitate financing stakeholders efficiently. Grants to mobilize value chain support could set a basis for FIs to design respective products. A linkage to concessional loans for value chain finance may further enhance the promotion of agricultural finance.

³⁸ AgriFin Blog (140, 2012).

Specifics in Madagascar

Which are the challenges to supporting the business of smallholder farmers in Madagascar?

- Farming methods are directed towards survival techniques that may even degrade the eco-system the farmers depend on
- Smallholders have a low level of mechanization and often don't use modern agricultural techniques.
- Productivity is low, meaning that smallholders generally do not expand from or leave subsistence levels
- Smallholders are often not linked to defined value-chains.³⁹
- Many of the smallholder farmers have limited knowledge of agronomic best practices and do not use high quality inputs, leading to low yields and revenue.
- Some farmers reported that they have used, or are using, extension services provided by the Government⁴⁰
- The productivity of agricultural firms could be greatly increased if they made more use of simple technology.
- Reluctance of farmers to accept new agricultural technologies or use different crop varieties
- Low levels of linkages: Farmers are not integrated in value chains, or cannot take part on out-grower schemes

What has ABM done related to these challenges?

- ABM has opted not to engage in non-financial support services, due to the possibility that clients may confuse services. (For example, if agricultural extension advice fails to result in improved yields, that the client is not expected to repay his or her loan.) However, some clients have received extension services from the government or other organizations, which ABM views favorably and LOs may encourage clients to take advantage of.
- To date, ABM's experience working with farming organizations has not been entirely positive, so care must be taken in dealing with these organizations. The lack of "aggregators" like strong, effective farmer associations means that there are limited opportunities to apply leverage to expand outreach.

What could be done related to the area of extension services or value chains?

- Outsource extension services to qualified extension service providers (e.g. agricultural institutes, NGOs, government ministries).
- Integrate – to some extent – the provision of agricultural technical knowledge into the service range as a financial institution. A possible 'light' format could be SMS-based or app-based information on certain practices, the adequate timing of potential measures (fertilization, pest control), or up-to-date price information.
- Grants to foster VC development and strengthen linkages.
- Grants to fund trial of new technologies by farmers on limited parts of their land, to reduce farmers' risk and therefore reluctance.

It should be noted that extension services or the definition of value chains become only effective if respective financing is available to the farmers. To ensure such financing, additional promotional tools (such as concessional loans) may be needed.

5.4 Feasible Promotional Instruments for ABM

We recommend the following promotional instruments to better serve smallholders' financial needs while at the same time allowing for a sustainable banking approach.

³⁹ According to Dalberg Initiative (2014), approx. 90% operate outside of value chains.

⁴⁰ Interview of seven farmers in November 2015.

Instruments	Description	Estimated potential	Recommended timing	ABM
Instrument 1	Grants to FIs for a non-banking agent partnership or a mobile payment service	high	immediately	Primary importance
Instrument 2	Concessionary credit-lines to farmers (ideally in combination with Instrument 3 and dedicated to the promotion of technology that enhances the smallholders' productivity)	medium	medium-term	Primary importance
Instrument 3	Grants for extension services to smallholders in combination with credit (see Instrument 2)	high	immediately	Indirectly important

Promotional instrument 1: focus on delivery channels

The **cost-effective delivery of financial services**, i.e. reaching out to rural clients and to remoter villages at reasonable costs is one of the greatest challenges in many regions of Madagascar and also, other African countries. With 70% of the population living in rural areas, and 90% having a mobile phone, innovative distribution models should be considered for reaching out to clients at lower cost for both sides. Setting up full-fledged brick-and-mortar branches to target agricultural clients is not an optimal delivery mechanism. At the same time, clients often desire face-to-face interaction with banks' personnel. To find a reasonable balance between meeting demands and managing the cost of delivering services, FIs should be supported in this expansion strategy, which may be costly to implement in the innovation phase.

The respective promotional instruments to reduce transaction cost to reach out to farmers would mainly comprise of TA grants for FIs to design and implement such systems and to bring them to scale. It should be noted that the establishment of such channels involves considerable upfront investments.

Lower transaction costs for banking services: Transaction costs can be brought down by employing decentralized systems to serve rural customers. This includes agent banking, mobile payments and mobile banking, but also other technologies and systems that allow reaching out and communicating to farmers in an efficient manner.

Instrument 1: Grants for a mobile banking / non-banking agent partnership. A partnership between an financial institution and a mobile phone company offering mobile wallets helps to penetrate hard-to-reach rural areas, when branches are remote and farmers are not aggregated in associations or producer groups. Another way of agent-banking is partnering with a retail store chain. These models provide a way for connecting the financial institution and the client more rapidly, and hence, more cheaply, via agents on an aggregator or mobile phone company. A precondition for the latter approach is a high penetration of mobile technology, as well as a legal way of doing such business. In the case of retail agents, a chain of shops need to be available (e.g. the PEP Stores in South Africa).

Promotional instrument 2: concessionary credit lines

The situation and financial needs of smallholder farmers, and those related to banking business with this client group in other African countries is very similar to the market in Madagascar. Smallholders' characteristics generally

apply across countries and regions.⁴¹ Smallholders hardly express their financing needs, and therefore a proactive attitude on the part of the bank is required.

Smallholders could benefit from upgrades in farming technology, including fertilizer application as well as from more asset financing, e.g. loans for livestock, or irrigation systems. Generally, such products can only be rolled out after farmers have been convinced of and trained on the use of such technology (see Instrument 3 below).

The same can be said for products that can be offered beyond loans, to family members, and to linked businesses.

Instrument 2: Concessionary credit lines to increase the bank's provision of investment loans to the agricultural sector. Concessionary credit lines designed to promote growth and increased productivity in the agricultural sector could consist of credit lines combined with matching grants for the bank to:

- Promote portfolio growth and increased scale/profitability for the bank (presently the lowest margin client group, partly due to high fixed costs);
- Incentivize the bank to design/promote investment loans that enhance productivity

It should be noted that this instrument will be more beneficial if implemented together with Instrument 3 (see below).

Promotional instrument 3: focus on improving agricultural business of the smallholders

It is possible to improve the profitability of smallholders by increasing the productivity of their business. This can be accomplished via the following entry points:

Extension services provided as part of the bank's investment loans: FIs can deploy extension services on their own with dedicated field staff or loan officers. These FI typically charge smallholders for these services, either through a mandatory service fee bundled with the loan, or a separate fixed charge. However, this often poses a risk of confusion for the client: if extension services do not work, the client may feel he is not required to repay the loan. On the other hand, availability of extension services in many places in Africa is extremely thin and FIs may have a strong incentive to integrate some elements into their service offer, as even simple changes to techniques applied offer relatively strong returns. Again, technology may play an important role (SMS-based or application-based information services).

FIs can also outsource the delivery of extension service to an external provider that is already active in the market and established as an independent and trusted institution.

Mobilizing value chains may be an additional option for some regions in Africa; where value chains are well organized, however, in the case of ABM's smallholders and Madagascar, value chains, are not in place.

A **partnership with input suppliers** could be a useful compensation for the lacking value chains: When bundling the credit with extension services, the FI also has the possibility to partner with input suppliers who can provide the high-quality inputs that are commended.⁴² This could be especially relevant for investments into agricultural technology requiring a high level of know-how for its use. The feasibility of such an arrangement would have to be further explored with a field mission.

⁴¹ T. Carroll et al. (2012), "Catalyzing Smallholder Agricultural Finance", Dalberg Global Development Advisors.

⁴² Example of ACRE/Syngenta in Kenya.

In line with this, extension services and value chain mobilization will be more effective if they are made available to the farmers in combination with agricultural investment loans by the bank, which are supported by concessionary credit lines (see suggested promotion instrument 2).

Instrument 3: Grants for extension services provided as part of the bank’s investment loans to support smallholder farmers.

In the case of ABM, a partnership with, or sub-contracting of, an extension service provider could provide existing agricultural clients with the information needed to increase their productivity. However, it would be important to:

- Clearly inform the client that the results of extension services are not linked to loan repayment requirements;
- Choose a respected leader among multiple communities to act as a ‘demonstration case’, to overcome the existing reluctance of farmers to try new farming methods;

5.5 Effects of Feasible Promotional Instruments

Potential effects of recommended promotional instruments on smallholders

The most important promotional instruments in the case of Madagascar are listed below, with positive and negative effects on the client considered. All instruments have the potential to promote access to financial services and increase profitability among agricultural clients in the medium term.

Recommendation	+	-	Next Steps
<i>Grants for the development of alternative, cost-lowering delivery channels (agents, mobile, etc.) (instrument 1)</i>	Low-cost delivery channels will offer ABM clients reduced time and less frequency for traveling to the branch, and potentially lower costs for loan products.	High inception costs	Create a feasibility study for one sub-component (agents are already being implemented), namely the integration of an external wallet into ABM’s CBS.
<i>Concessionary credit lines (instrument 2)</i>	Long-term credit lines to finance fixed assets (such as cows, small tractors), fertilizers, or better seeds could help farmers increase their profitability. Credit lines with subsidized interest rates (whether for the bank or the end-client) could increase outreach by raising the profitability margin of the client segment (relative to other client	However, such credit lines need to be accompanied by intensive training /effective extension services for farmers to ensure the money is properly invested, and credit risk is well-controlled. There is a risk that such training will not be effective and that the expected return will not materialize.	Discuss and determine the possibility for and appropriate parameters of such a line.

	groups)		
<i>Capacity building grants for purchasing extension services for farmers (instrument 3)</i>	<p>The positive outcomes of receiving extension services at farmer level are a high chance of increased production and higher income.</p> <p>Extension services will be more effective, if linked to the availability of loans</p>	<p>However, the use of more inputs and better farming methods will also increase financial risks for the farmer.</p> <p>Farmers may believe that ABM's loan repayment is linked to the success of the technique involved or the success of the harvest in the respective year.</p>	<p>Brief feasibility study to identify partners, costs, pilot location, timeline, logistics, etc.</p>

6 Conclusions

6.1 Challenges to Providing Financial Services to Smallholder Farmers

In summary, the following topics are key obstacles, both on the supply and the demand side, for the expansion of banking with smallholder farmers.

- **Transaction costs** are high due to distances between bank and clients, both from the bank's and the client's perspective. In the case of ABM, this makes the segment the least profitable despite the loans bearing the highest interest rate.
- The **low level of technology** (machinery, crops, and fertilizer) and the **traditional cultivation methods** used by smallholder farmers **limits the natural growth achievable for their firms.**
- **Smallholders lack access to modern extension services.** Such services are not well known in Madagascar, and smallholders show reluctance to accepting new agricultural technologies or using different crop varieties.
- **Smallholders show a low level of linkages.** Farmers are often not integrated in value chains, or cannot take part in outgrower schemes.
- Smallholders are offered, and are using, a **limited range of products**, which does not include long-term loans, savings or electronic payments.

6.2 Findings on the Agricultural Finance Sector in Madagascar

The results of the analysis of the situation of the agricultural finance sector and farmers can be summarized as follows:

- The agricultural sector is important for the economy in Madagascar, and ABM intends to serve the rural market better with adequate financial products. Since there is still little market saturation in rural Madagascar, ABM intends to increase its market share in rural areas by targeting farmers, rural entrepreneurs that are directly or indirectly related to agricultural value chains, and non-agricultural rural enterprises.
- The main constraints faced in these attempts are high transaction costs both for clients and FIs. Specifically, transport costs to clients and, respectively, branches are still prohibitive for FIs (such as ABM).

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- Agricultural firms are considerably and significantly less profitable than non-agricultural firms (RoA for non-agricultural firms is around twice as high as for agricultural firms). The low profitability of farmers is largely linked to the lack of skills and even basic technology (such as the use of fertilizers, or using bulls or small tractors to draw ploughs).
 - There are only 3 major suppliers of credit to small scale farmers (apart from a few more that offer storage loans only). The products are fairly priced and tailor-suited to the needs and cash-flows of farmers. The problem is rather the lack of access to these largely well-designed products altogether due to prohibitive transaction costs.
 - Agricultural firms with access to finance wait longer to receive a loan and receive relatively less (compared to what they request for) than non-agricultural firms.
 - The relative share of repayment obligations on income and cost variables is considerably and statistically significantly higher for agricultural borrowers than for non-agricultural borrowers. Repayment obligations stress agricultural borrowers more than non-agricultural borrowers and – at least for borrowers of ABM – further increasing repayment obligations may lead to client over-indebtedness and an increased credit risk.
 - The financing conditions for agricultural firms that can access them are adequate. However, prohibitive transaction costs lead to an underserved demand among agricultural firms.

Under the current circumstances, LFS believes that farmers with access to loans are adequately served when considering the technology they employ at the moment. However:

- These borrowers may further benefit from efficiency gains that could be realized by FIs.
- Likewise, small scale farmers that are currently excluded from the formal finance sector could be served at reasonable costs if transaction costs can be brought down.
- The productivity of agricultural firms could be greatly increased if they made heavier use of simple technology.

6.3 Further Investigations of the Suggested Promotional Instruments

Of the three suggested recommendations, ABM has shown great interest in pursuing one sub-component of the first recommendation further. The author therefore proposes to create a feasibility study for the integration of an external wallet into ABM's CBS provided that additional funds could be raised for setting up the interface.

The following table outlines the next steps, factors for consideration, and required inputs needed to evaluate the feasibility of these recommendations.

Recommendation	Next Steps	Required inputs	Key factors regarding feasibility of implementation
<p><i>Grants for the development of alternative, cost-lowering delivery channels (agents, mobile, etc.) (instrument 1)</i></p>	<p>Create a feasibility study for one sub-component (agents are already being implemented), namely the integration of an external wallet into ABM's CBS.</p>	<ul style="list-style-type: none"> - Creating a business case - Estimating the cost savings for clients and the demand - Estimating training needs for clients and staff - Estimating the costs - Assessing the risks 	<ul style="list-style-type: none"> - Positive business case (highly likely) - Feasibility of a timely implementation from a technical perspective (IT interface)
<p><i>Concessionary credit lines (instrument 2)</i></p>	<p>Discuss and determine the possibility for and appropriate parameters of such a line.</p> <p>Identify a consultant to conduct a brief demand study and respective TOR.</p>	<ul style="list-style-type: none"> - Demand study: <ul style="list-style-type: none"> • On the interest of farmers in long-term loans, and on the type & cost of fixed assets available to them. Identify any structural partnerships that could be arranged to facilitate fixed assets. • On the sensitivity of clients and ABM to cheaper funding. <p>This should result in estimated size (# and volume of loans) and type (short v. long-term) of additional demand that could be met with cheaper funding</p> - Current and planned Treasury position of ABM; ABM business plan and management buy-in - Interest and capability of KfW to provide such funding - Evaluation on how the credit line could be 	<ul style="list-style-type: none"> - Willingness of farmers to use credit for (a) agricultural fixed assets and (b) productivity enhancing inputs (fertilizer, seeds, etc.), over other uses (school fees, personal items, etc.) - Success of extension services in stimulating demand (possibly) - Appetite of clients to take larger loans or take a first time loan due to their increased repayment capacity (because of lower interest costs/cheaper funding) - Appetite of ABM to increase geographic outreach or serve clients with lower absolute repayment capacities as result of cheaper funds

		structured so as to constitute a 'sustainable subsidy' and minimize market distortions	
<i>Capacity building grants for purchasing extension services for farmers (instrument 3)</i>	Identify a consultant to conduct a brief feasibility study on extension services and respective TOR.	Conduct brief in-country feasibility study to identify: <ul style="list-style-type: none"> - Extension service providers and national input suppliers who are potential partners - Costs, pilot location, timeline, logistics, etc 	- Identifying trustworthy community leaders to act as 'demonstration cases' with the new technology

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Annex 2 Summary Statistics

Table 16 Summary statistics: agro vs non-agro

Indicator	Total	Non-agro	Agro (crop and warehouse)
Number of borrowers	59461	53708	5753
Date of first disbursement	2007-02	2007-02	2010-11
Date of last disbursement	2015-02	2015-02	2015-02
Proportion of repeated borrowers	51.16	52.10	42.45
Average age of borrower	41.55	41.34	43.58
Proportion of female borrowers	54.14	56.91	28.32
Proportion of married borrowers	85.37	84.80	90.63
Average number of family members	4.05	3.96	4.88
Median of beginning of entrepreneurship	2006	2007	2002
Proportion of borrowers with no other employment	98.06	97.97	98.87
Proportion of loans for working capital only	72.08	70.29	88.77
Proportion of loans for working capital and fixed assets	11.95	12.75	4.54
Proportion of loans for fixed assets only	12.46	13.13	6.21
Average deposits	27.38	29.45	7.97
Current assets	223.36	237.55	90.81
Stock	353.61	371.49	186.65
Fixed assets	1191.84	1235.86	780.87
Total assets	1774.89	1851.50	1059.76
Total collateral value	1875.99	1959.40	1097.28
Total collateral granted	1847.70	1928.17	1096.47
Liabilities to other FIs	62.87	65.70	36.54
Advance payment from suppliers	24.43	24.76	21.36
Advance payment from clients	6.09	6.59	1.43
Sales	12644.53	13739.17	2425.32
Receivables	847.74	810.55	1194.99
Other income	436.08	450.49	301.52
Gross income	12988.68	14092.42	2684.51
Costs of sales	9544.53	10507.67	552.97
Operational costs	1113.09	1148.01	787.05
Payables	361.77	381.51	177.45
Family expenses	1014.97	1085.61	355.55
Total expenses	11519.30	12582.11	1597.20
Repayment capacity	1469.38	1510.31	1087.31
Repayment capacity - installment	976.15	1002.12	733.69

Table 17 Summary statistics: micro vs SME

Indicator	Total	SME	Micro
Number of borrowers	59461	472	58989
Date of first disbursement	2007-02	2007-07	2007-02
Date of last disbursement	2015-02	2015-01	2015-02
Proportion of repeated borrowers	51.16	57.84	51.11
Average age of borrower	41.55	44.73	41.53
Proportion of female borrowers	54.14	37.29	54.28

Proportion of married borrowers	85.37	88.98	85.34
Average number of family members	4.05	4.24	4.05
Median of beginning of entrepreneurship	2006	2005	2006
Proportion of borrowers with no other employment	98.06	96.61	98.07
Proportion of loans for working capital only	72.08	47.67	72.27
Proportion of loans for working capital and fixed assets	11.95	25.64	11.84
Proportion of loans for fixed assets only	12.46	15.04	12.44
Average deposits	27.38	186.29	26.10
Current assets	223.36	1915.02	209.82
Stock	353.61	2935.23	332.95
Fixed assets	1191.84	13769.20	1091.20
Total assets	1774.89	18703.13	1639.44
Total collateral value	1875.99	17875.19	1747.97
Total collateral granted	1847.70	17624.29	1721.47
Liabilities to other FIs	62.87	841.45	56.64
Advance payment from suppliers	24.43	432.19	21.17
Advance payment from clients	6.09	83.69	5.47
Sales	12644.53	85706.88	12059.92
Receivables	847.74	9318.42	779.97
Other income	436.08	2021.60	423.39
Gross income	12988.68	87112.29	12395.58
Costs of sales	9544.53	65605.91	9095.95
Operational costs	1113.09	9411.24	1046.69
Payables	361.77	5403.21	321.43
Family expenses	1014.97	3567.39	994.55
Total expenses	11519.30	77548.46	10990.96
Repayment capacity	1469.38	9563.83	1404.61
Repayment capacity - installment	976.15	6434.23	932.48

Table 18 Summary statistics: non-agro loans detailed by micro vs SME

Indicator	Total Non-agro	SME	Micro
Number of borrowers	53708	471	53,237
Date of first disbursement	2007-02	2007-07	2015-01
Date of last disbursement	2015-02	2007-02	2015-02
Proportion of female borrowers	56.91	37.37	57.08
Proportion of married borrowers	84.80	88.96	84.76
Proportion of repeated borrowers	52.10	57.75	52.05
Average age of borrower	41.34	44.76	41.31
Average number of family members	3.96	4.24	3.96
Median of beginning of entrepreneurship	2007	2005	2007
Proportion of borrowers with no other employment	97.97	96.60	97.98
Proportion of loans for working capital only	70.29	47.56	70.49
Proportion of loans for working capital and fixed assets	12.75	25.69	12.63
Proportion of loans for fixed assets only	13.13	15.07	13.11
Average deposits	29.45	186.69	28.06
Current assets	237.55	1912.21	222.74
Stock	371.49	2937.42	348.79

Fixed assets	1235.86	13758.65	1125.07
Total assets	1851.50	18692.13	1702.50
Total collateral value	1959.40	17865.39	1818.68
Total collateral granted	1928.17	17613.96	1789.40
Liabilities to other FIs	65.70	840.30	58.84
Advance payment from suppliers	24.76	433.11	21.14
Advance payment from clients	6.59	83.86	5.91
Sales	13739.17	85770.57	13101.89
Receivables	810.55	9330.50	735.17
Other income	450.49	2025.89	436.55
Gross income	14092.42	87178.96	13445.81
Costs of sales	10507.67	65745.20	10018.97
Operational costs	1148.01	9328.16	1075.64
Payables	381.51	5414.68	336.98
Family expenses	1085.61	3573.75	1063.60
Total expenses	12582.11	77608.82	12006.81
Repayment capacity	1510.31	9570.14	1439.00
Repayment capacity - installment	1002.12	6439.63	954.02

Table 19 Summary statistics: micro loans detailed by sector

Indicator	Total Micro	Non-agro trade	Non-agro production	Non-agro service	Crop	Warehouse	Livestock	Other agro
Number of borrowers	58989	23108	4576	18584	5491	123	2395	4065
Date of first disbursement	2007-02	2007-02	2007-02	2007-02	2010-11	2013-07	2007-07	2007-02
Date of last disbursement	2015-02	2015-02	2015-02	2015-02	2015-02	2014-09	2015-02	2015-02
Proportion of female borrowers	51.11	54.03	54.31	48.48	42.85	59.35	51.90	53.11
Proportion of married borrowers	41.52818	40.05	42.52	42.44	43.65	41.40	42.75	40.91
Proportion of repeated borrowers	54.28	63.62	50.09	51.95	27.65	49.59	48.43	55.40
Average age of borrower	85.34	84.12	87.30	84.20	90.84	89.43	86.81	86.62
Average number of family members	4.047602	3.90	4.07	3.94	4.92	4.27	4.13	4.11
Median of beginning of entrepreneurship	2006	2007	2004	2007	2001	2008	2008	2006
Proportion of borrowers with no other employment	98.07	98.46	98.49	97.34	99.03	97.56	96.20	98.50
Proportion of loans for working capital only	72.27	82.95	70.78	53.45	88.80	77.24	68.89	77.47
Proportion of loans for working capital and fixed assets	11.84	3.57	9.13	25.73	4.55	12.20	14.78	7.60
Proportion of loans for fixed assets only	12.44	10.88	18.01	14.74	6.17	7.32	13.86	12.37
Average deposits	26.10	26.52	15.63	33.90	6.73	9.64	27.36	26.19

Current assets	209.82	227.70	164.04	236.04	86.27	217.85	181.02	227.43
Stock	332.95	522.91	326.25	143.02	173.87	267.26	411.72	270.25
Fixed assets	1091.20	573.17	651.02	2063.18	765.48	1125.44	1113.44	618.00
Total assets	1639.44	1326.75	1159.29	2449.73	1026.89	1617.49	1708.66	1119.88
Total collateral value	1747.97	1548.31	1267.03	2416.80	1059.08	1727.52	1540.64	1464.28
Total collateral granted	1721.47	1523.59	1252.73	2382.86	1058.22	1727.67	1527.23	1404.16
Liabilities to other FIs	56.64	51.10	39.68	79.12	35.72	56.71	45.18	42.22
Advance payment from suppliers	21.17	20.03	12.77	22.77	19.63	25.43	23.10	29.87
Advance payment from clients	5.47	2.95	17.99	7.48	1.28	6.94	2.48	4.21
Sales	12059.92	15911.05	8649.25	9997.51	2302.28	9979.15	6642.22	20345.62
Receivables	779.97	703.78	810.82	687.78	1202.33	579.36	779.97	986.80
Other income	423.39	388.65	287.10	555.97	277.14	399.26	550.93	316.73
Gross income	12395.58	16204.56	8881.04	10451.39	2541.38	10305.99	7085.60	20585.13
Costs of sales	9095.95	13207.58	5966.48	6412.15	520.46	7188.88	3742.33	16820.72
Operational costs	1046.69	686.77	911.44	1478.52	717.12	904.53	1551.73	1394.32
Payables	321.43	332.34	167.77	381.15	180.60	226.53	158.33	448.17
Family expenses	994.55	1016.29	981.77	1155.26	341.28	1000.75	878.69	1099.53
Total expenses	10990.96	14793.33	7734.90	8870.58	1498.59	9003.66	5792.92	19163.60
Repayment capacity	1404.61	1411.23	1146.14	1580.81	1042.80	1302.33	1292.68	1421.53
Repayment capacity - installment	932.48	941.20	748.14	1037.31	697.35	842.51	855.94	983.34

Table 20 Summary statistics: SME loans detailed by sector

Indicator	Total SME	Non-agro trade	Non-agro production	Non-agro service	Crop	Warehouse	Livestock	Other agro
Number of borrowers	472	119	15	301	1	15	15	15
Date of first disbursement	2007-07	2011-01	2011-02	2007-07	2014-12	2014-07	2011-10	2012-11
Date of last disbursement	2015-01	2015-01	2015-01	2015-01	2014-12	2014-07	2015-01	2015-01
Proportion of repeated borrowers	57.84	67.23	46.67	52.16	100.00	100.00	73.33	73.33
Average age of borrower	44.73	43.10	42.73	45.27	30.00	41.00	44.47	47.13
Proportion of female borrowers	37.29	48.74	53.33	31.23	100.00	100.00	33.33	46.67
Proportion of married borrowers	88.98	91.60	93.33	88.04	100.00	100.00	100.00	73.33
Average number of family members	4.24	4.23	4.20	4.23	3.00	4.00	4.80	3.87
Median of beginning of entrepreneurship	2005	2004	2004	2006	2010	2010	2005	2003

Proportion of borrowers with no other employment	96.61	100.00	100.00	95.02	100.00	100.00	100.00	93.33
Proportion of loans for working capital only	47.67	66.39	40.00	39.87	100.00	100.00	46.67	53.33
Proportion of loans for working capital and fixed assets	25.64	6.72	33.33	32.89	0.00	0.00	20.00	26.67
Proportion of loans for fixed assets only	15.04	18.49	20.00	13.62	0.00	0.00	26.67	6.67
Average deposits	186.29	224.26	26.01	171.79	1.20	143.81	308.94	74.46
Current assets	1915.02	2520.72	1475.59	1718.87	3240.00	226.80	1282.86	1857.14
Stock	2935.23	6067.75	2865.70	1411.66	1904.36	356.40	8250.80	3312.85
Fixed assets	13769.20	8560.54	13635.59	16361.86	18738.00	7065.90	11653.70	7235.64
Total assets	18703.13	17210.43	18101.90	19570.67	23882.36	7649.10	21619.35	12423.62
Total collateral value	17875.19	17563.46	16856.82	18130.80	22491.00	14004.90	19229.94	15805.62
Total collateral granted	17624.29	17408.99	16856.82	17798.01	22491.00	14004.90	19229.94	15814.26
Liabilities to other FIs	841.45	1319.22	434.41	714.57	1379.91	0.00	730.95	308.72
Advance payment from suppliers	432.19	504.58	299.26	430.99	0.00	540.00	96.86	126.00
Advance payment from clients	83.69	61.42	125.01	78.29	0.00	0.00	432.00	18.00
Sales	85706.88	127960.60	70476.05	65471.48	55709.11	108864.00	101910.40	168814.90
Receivables	9318.42	8893.13	4605.98	9032.50	3628.80	8104.13	12008.90	19914.28
Other income	2021.60	1913.60	1190.73	2062.99	0.00	0.00	2456.78	3027.41
Gross income	87112.29	129347.20	71620.98	66923.27	55709.11	108864.00	103595.20	169910.20
Costs of sales	65605.91	109038.30	39685.48	45494.04	0.00	94000.18	79833.01	151545.30
Operational costs	9411.24	7026.07	18260.19	9361.66	48543.84	5783.40	20246.54	7005.94
Payables	5403.21	6127.57	891.22	5599.18	0.00	3402.93	2941.05	4992.83
Family expenses	3567.39	4226.25	3171.45	3326.86	573.48	2057.40	4713.37	2951.39
Total expenses	77548.46	119566.80	60358.19	57466.17	49117.32	101841.00	93846.44	160997.90
Repayment capacity	9563.83	9780.38	11262.80	9457.10	6591.78	7023.02	9748.80	8912.27
Repayment capacity - installment	6434.23	6262.81	8256.80	6470.82	3891.78	4863.02	6444.13	5823.39

Annex 3 Regression Analyses on Proxies for Access to Finance

Regression on Loan Size

The table below regresses the loan amount on selected independent variables. To keep the table short, some independent variables are not reported if they were not significant (particularly variables that were transformed into binary variables such as sector or branch dummies). Results suggest that the initially significant negative effect of being an agricultural firm on the loan size disappears when controlling for variables that reflect the business size.

Table 21: Regression on loan size

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age	-0.00582*** (0.000198)	-0.00430*** (0.000198)	-0.00232*** (0.000212)	-0.00233*** (0.000211)	-0.00207*** (0.000217)	-0.00200*** (0.000212)	
Female	0.0636*** (0.00398)	0.0651*** (0.00396)	0.0382*** (0.00411)	0.0414*** (0.00412)	0.0384*** (0.00405)	0.0411*** (0.00408)	
Married	-0.0411*** (0.00821)	-0.0229*** (0.00802)	-0.0174** (0.00772)	-0.0156** (0.00769)	-0.0144* (0.00758)	-0.0115 (0.00756)	
Widowed	-0.00148 (0.012)	-0.00734 (0.0117)	-0.00259 (0.0112)	-0.00294 (0.0111)	-0.00523 (0.0108)	-0.0046 (0.0108)	
Divorced	-0.00617 (0.013)	-0.00432 (0.0126)	-0.0124 (0.012)	-0.0123 (0.0119)	-0.0158 (0.0117)	-0.0141 (0.0116)	
Number family members	5.99E-05 (0.00114)	-0.00392*** (0.00117)	-0.00555*** (0.00113)	-0.00590*** (0.00114)	-0.00473*** (0.00112)	-0.00443*** (0.00116)	
Disbursed in 2012		0.129*** (0.0205)	0.101*** (0.02)	0.0793*** (0.0202)	0.0754*** (0.0198)	0.0900*** (0.0196)	
Disbursed in 2013		0.168*** (0.0208)	0.131*** (0.0202)	0.108*** (0.0205)	0.109*** (0.02)	0.126*** (0.0198)	
Disbursed in February		-0.00844 (0.00944)	-0.0098 (0.00897)	-0.0104 (0.00892)	-0.00557 (0.0087)	-0.00574 (0.00864)	
Disbursed in October		0.00304 (0.00919)	0.000867 (0.00877)	-0.00068 (0.00867)	0.00339 (0.00852)	0.0051 (0.00848)	
Disbursed in November		0.00917 (0.00952)	0.00402 (0.00918)	0.00394 (0.00921)	0.00797 (0.00903)	0.0088 (0.00898)	
Disbursed in December		0.0145 (0.00899)	0.0123 (0.00858)	0.0106 (0.00859)	0.0147* (0.00842)	0.0164* (0.00839)	
Number of installments		-0.00134 (0.00467)	0.00272 (0.00451)	0.00328 (0.00449)	-0.0014 (0.0044)	-0.00183 (0.00439)	
Interest rate		0.00886*** (0.00102)	0.00656*** (0.001)	0.00601*** (0.000985)	-0.00186 (0.00118)	-0.00403 (0.00105)	
Deposits in MDG		-1.20e-08*** (2.24E-09)	-9.41e-09*** (2.04E-09)	-8.77e-09*** (2.01E-09)	-3.87e-09** (1.94E-09)	-1.58E-09 (2.08E-09)	
New client		-0.135*** (0.00391)	-0.150*** (0.00389)	-0.152*** (0.004)	-0.145*** (0.00392)	-0.134*** (0.00399)	
Length of loan, months		0.000982 (0.00459)	0.00359 (0.00444)	0.0033 (0.00442)	0.00975** (0.00435)	0.00706 (0.00432)	
Reason: investment			-0.0188*** (0.0053)	-0.0179*** (0.00532)	-0.0182*** (0.00531)	-0.0177*** (0.00521)	
Reason: investment + WCR			0.00204 (0.00497)	-0.00088 (0.00509)	0.000784 (0.00497)	8.20E-05 (0.00492)	
Reason: other			-0.0301*** (0.00918)	-0.0245*** (0.00948)	-0.0158* (0.00927)	-0.0142 (0.00934)	
Year beginning enterprise			0.00347*** (0.000316)	0.00320*** (0.000316)	0.00237*** (0.000311)	0.00241*** (0.000311)	
Sector: used clothing			0.0710*** (0.00942)	0.0725*** (0.00938)	0.0586*** (0.00924)	0.0590*** (0.0092)	
Sector: grocery			-0.118*** (0.0076)	-0.120*** (0.00775)	-0.127*** (0.00766)	-0.128*** (0.00768)	
Sector: cheap restaurant			0.0628*** (0.00994)	0.0618*** (0.00999)	0.0370*** (0.0102)	0.0380*** (0.0101)	
Branch number 2				0.0259*** (0.0075)	0.0191*** (0.00729)	0.0165** (0.0073)	
Stock					-1.46e-08*** (1.46E-09)	1.05e-08*** (2.71E-09)	
Fixed assets					-4.30e-09*** (1.05E-09)	1.98e-08*** (2.37E-09)	
Advanced payment: suppliers					2.11e-08*** (2.25E-09)	2.26e-08*** (2.30E-09)	
Advanced payment: clients					-1.28e-08** (6.32E-09)	1.61e-08** (6.68E-09)	
Gross income					-1.02e-10*** (0)	6.91e-09*** (1.62E-09)	
Repayment capacity					8.46E-11 (6.13E-11)	-1.85e-09* (1.11E-09)	
Total assets						-2.40e-08*** (2.12E-09)	
Sales						-5.07e-09*** (1.49E-09)	
Operational costs						-1.33E-09 (1.08E-09)	
Cost products						-1.86e-09* (1.11E-09)	
Payment in interests						6.27e-08*** (1.10E-09)	
Family expenses						-5.56e-09*** (1.74E-09)	
Other income						-4.69e-09*** (1.58E-09)	
Collateral value						4.01E-10 (6.02E-10)	
Collateral granted						-9.05E-10 (1.03E-09)	
Agricultural firm	-0.135*** (0.00743)	-0.102*** (0.00757)	-0.231*** (0.0109)	0.0863 (0.105)	0.0595 (0.105)	0.0815 (0.102)	0.0667 (0.101)
Observations	59,463	59,463	59,463	59,463	59,463	59,463	59,461
R-squared	0.007	0.029	0.068	0.14	0.149	0.184	0.191

Regression on difference between applied and granted loan amount

The table below reports the results of a regression analysis on the difference between requested and approved loan amount.

An unconditional naïve estimation (column 1 of the table below) indicates the presence of a positive effect of being an agricultural borrower on the difference between applied and disbursed loan amount. However, this estimation might suffer of omitted variable bias. For example, agricultural clients of the MFI under consideration receive more loans during the period between September and December and the MFI tends to offer lower access during those months. In fact, by including loans characteristics as control variable (see column 3) the sign of the dummy for agricultural borrowers is reversed. That is, agricultural borrowers tend to have higher credit access than non-agricultural clients, in terms of difference between applied and disbursed amount. This result is robust to the inclusion of new controls and the magnitude of this coefficient is large. In fact, agricultural borrowers tend to receive loans that are MGA 378,629 MGA (around EUR 102) lower than what applied with respect to non-agricultural clients. Estimating the coefficient of the last column of the table below in log terms we obtain that the difference between applied and disbursement amount is 50 % higher for non-agricultural borrowers.

Table 22: Regression on difference between applied and granted loan amount

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age		676 (482.5)	-1,387*** (474.4)	-730.2 (513.7)	-534.9 (508.5)	-423.7 (509.2)	-456.9 (516)
Female		-39,477*** (9604)	-7,750 (9355)	-12,166 (9962)	-25,295** (9900)	-22,357** (9893)	-19,468* (9937)
Married		-17,075 (16171)	-15,348 (15779)	-16,633 (15731)	-16,341 (15586)	-17,179 (15569)	-20,112 (15587)
Widowed		-35,482 (28537)	-2,015 (27689)	-10,251 (27513)	-9,561 (27328)	-10,752 (27310)	-4,876 (27206)
Divorced		20,385 (30193)	38,269 (29361)	28,822 (29033)	21,148 (28844)	21,267 (28831)	25,917 (28675)
Number family members		2,889 (2998)	13,615*** (3018)	13,847*** (3012)	11,335*** (2986)	10,085*** (2992)	8,754*** (3009)
Disbursed in 2012			-64,087 (43481)	-58,677 (44222)	-42,451 (45332)	-37,279 (44991)	11,482 (45305)
Disbursed in 2013			-200,702*** (44153)	-196,149*** (44816)	-195,647*** (45972)	-194,417*** (45624)	-142,590*** (45910)
Disbursed in February			-14,738 (26181)	-15,356 (26078)	-16,445 (25883)	-18,385 (25840)	-20,523 (25809)
Disbursed in October			-73,271*** (23620)	-72,469*** (23554)	-89,888*** (23388)	-91,918*** (23352)	-87,435*** (23284)
Disbursed in November			-93,915*** (23385)	-93,419*** (23340)	-116,422*** (23218)	-118,020*** (23198)	-114,799*** (23138)
Disbursed in December			-104,782*** (22847)	-102,862*** (22788)	-121,883*** (22670)	-122,779*** (22621)	-119,152*** (22543)
Number of installments			-3,536 (10689)	-1,697 (10633)	-4,242 (10575)	-959.8 (10554)	-578.8 (10500)
Interest rate			-61,464*** (1954)	-58,574*** (1926)	-57,112*** (1906)	-52,227*** (1874)	-38,504*** (1660)
Deposits in MDG			-0.0144*** (0.0048)	-0.0152*** (0.00462)	-0.0172*** (0.00466)	-0.0201*** (0.00484)	-0.0239*** (0.00523)
New client			-223,055*** (9,573)	-223,609*** (9,527)	-183,184*** (9,589)	-189,670*** (9,610)	-177,735*** (9,501)
Length of loan, months			31,111*** (10,528)	29,972*** (10,465)	34,345*** (10,401)	30,524*** (10,386)	16,851 (10,313)
Reason: investment				44,724** (17952)	34,629* (18027)	38,967** (18015)	29,560* (17957)
Reason: investment + WCR				114,312*** (14608)	121,095*** (14700)	120,667*** (14709)	114,821*** (14649)
Reason: other				157,284*** (35671)	112,029*** (35613)	111,081*** (35614)	96,269*** (35676)
Year beginning entreprise				434.9 (806.8)	1,457* (806.7)	1,948** (806.3)	2,166*** (811.6)
Sector: used clothing				-107,414*** (21472)	-76,402*** (21389)	-69,753*** (21317)	-63,496*** (21128)
Sector: grocery				-129,608*** (20663)	-86,988*** (20779)	-87,644*** (20798)	-76,996*** (20587)
Sector: cheap restaurant				-221,865*** (23196)	-172,853*** (23302)	-157,884*** (23397)	-148,614*** (23206)
Branch number 2					-209,692*** (27681)	-206,992***	-202,272***
Stock						0.00697*** (0.00246)	0.0144*** (0.00553)
Fixed assets						-0.000128 (0.000477)	0.0112** (0.0048)
Advanced payment: suppliers						-0.00875 (0.0107)	-0.00156 (0.00634)
Advanced payment: clients						-0.0304*** (0.0102)	-0.0258** (0.0127)
Gross income						0.000439*** (0.000111)	0.00145 (0.00482)
Repayment capacity						8.91E-05 (0.000608)	-0.00253* (0.00148)
Total assets							-0.0141*** (0.00472)
Sales							0.00106 (0.0047)
Operational costs							-0.00246* (0.00138)
Cost products							-0.00231 (0.00146)
Payment in interests							0.0661** (0.0296)
Family expenses							0.00461 (0.0034)
Other income							0.00228 (0.00433)
Collateral value							-0.0024 (0.00282)
Collateral granted							0.0135*** (0.00372)
Agricultural firm	-255,209*** (12223)	-269,474*** (12956)	305,868*** (21186)	397,375*** (102207)	464,531*** (101200)	452,990*** (100757)	378,629*** (98204)
Observations	59,463	59,463	59,463	59,463	59,463	59,463	59,461
R-squared	0.005	0.005	0.06	0.07	0.088	0.091	0.099

Regression on the number of days elapsed between loan application and disbursement

The dependent variable of the regression below consists of the number of days between loan application and disbursement to reflect the “waiting time” as a proxy for credit access. Agricultural clients are found to have significantly lower credit access looking at waiting time between the application date and the disbursement date.

Table 23: Regression on the number of days elapsed between loan application and disbursement

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age	0.00102*** (0.000182)	0.000618*** (0.000176)	0.000499*** (0.000182)	0.000551*** (0.000179)	0.000521*** (0.000179)	0.000513*** (0.000182)	
Female	0.00612 (0.00392)	0.00306 (0.00387)	0.00885** (0.00442)	0.00521 (0.00441)	0.00557 (0.00441)	0.00547 (0.00437)	
Married	0.00948 (0.00649)	0.0089 (0.0064)	0.00879 (0.00639)	0.0110* (0.00623)	0.0106* (0.00625)	0.00997 (0.00628)	
Widowed	0.00907 (0.00907)	0.006 (0.006)	0.0059 (0.0059)	0.00698 (0.00698)	0.00701 (0.00701)	0.00794 (0.00794)	
Divorced	-0.00959 (0.0121)	-0.00922 (0.0119)	-0.00928 (0.0119)	-0.00906 (0.0118)	-0.00906 (0.0118)	-0.00907 (0.0118)	
Number family members	0.000929 (0.00391** (0.0019)	0.00811 (0.00197)	0.00874 (0.00195)	0.00798 (0.00191)	0.00825 (0.00191)	0.00906 (0.00187)	
Disbursed in 2012		-0.458*** (0.0268)	-0.443*** (0.0273)	-0.448*** (0.0278)	-0.448*** (0.0278)	-0.440*** (0.0276)	
Disbursed in 2013		-0.479*** (0.0263)	-0.462*** (0.0266)	-0.474*** (0.0268)	-0.474*** (0.0267)	-0.466*** (0.0266)	
Disbursed in February		-0.0147 (0.0131)	-0.0152 (0.0131)	-0.0168 (0.0131)	-0.0175 (0.0132)	-0.0178 (0.0132)	
Disbursed in October		-0.00835 (0.0139)	-0.00838 (0.0139)	-0.0258* (0.014)	-0.0266* (0.0141)	-0.0256* (0.0141)	
Disbursed in November		-0.00243 (0.0126)	-0.00204 (0.0126)	-0.0213* (0.0126)	-0.0220* (0.0127)	-0.0212* (0.0127)	
Disbursed in December		-0.0138 (0.0128)	-0.0137 (0.0127)	-0.0319** (0.0127)	-0.0326** (0.0128)	-0.0318** (0.0129)	
Number of installments		0.139*** (0.0035)	0.138*** (0.00347)	0.140*** (0.00342)	0.141*** (0.00343)	0.140*** (0.00341)	
Interest rate		-0.00171 (0.00117)	-0.00111 (0.0012)	-0.000375 (0.00117)	0.000672 (0.00118)	0.00271** (0.00125)	
Deposits in MDG		3.61E-10 (1.41E-09)	-2.35E-10 (1.48E-09)	0 (1.47E-09)	-6.8E-10 (1.50E-09)	-1.43E-09 (1.52E-09)	
New client		-0.0874*** (0.00417)	-0.0842*** (0.00411)	-0.0571*** (0.0037)	-0.0580*** (0.00369)	-0.0570*** (0.00378)	
Length of loan, months		-0.138*** (0.00349)	-0.138*** (0.0035)	-0.138*** (0.00344)	-0.139*** (0.00345)	-0.140*** (0.00339)	
Reason: investment			-0.000857 (0.00513)	0.00546 (0.0053)	0.00537 (0.0053)	0.0038 (0.00526)	
Reason: investment + WCR			0.0133 (0.00892)	0.0187** (0.00929)	0.0185** (0.0093)	0.0179* (0.00938)	
Reason: other			-0.0316*** (0.00656)	-0.0310*** (0.00699)	-0.0321*** (0.00702)	-0.0340*** (0.00698)	
Year beginning enterprise			-0.000409 (0.000413)	0.0000549 (0.000416)	0.000151 (0.000413)	0.000125 (0.000409)	
Sector: used clothing			-0.00209 (0.00771)	-0.00473 (0.00774)	-0.00386 (0.00775)	-0.00356 (0.00776)	
Sector: grocery			-0.0150** (0.00647)	-0.0174*** (0.00658)	-0.0175*** (0.00658)	-0.0166** (0.00659)	
Sector: cheap restaurant			-0.0196*** (0.00739)	-0.0179** (0.00733)	-0.0162** (0.0074)	-0.0158** (0.00741)	
Branch number 2				0.0325*** (0.00741)	0.0329*** (0.00741)	0.0336*** (0.00739)	
Stock					9.08e-10* (5.39E-10)	-1.61E-10 (1.39E-09)	
Fixed assets					5.80e-10** (2.30E-09)	1.55E-10 (1.18E-09)	
Advanced payment: suppliers					1.67E-09 (1.38E-09)	2.71e-09*** (9.79E-10)	
Advanced payment: clients					-5.90e-09** (2.36E-09)	-7.83e-09*** (2.52E-09)	
Gross income					0* (0)	-1.43E-09 (2.52E-09)	
Repayment capacity					0 (0)	3.09E-10 (2.52E-09)	
Total assets						0 (2.52E-09)	
Sales						1.09E-09 (1.10E-09)	
Operational costs						1.23E-10 (2.83E-09)	
Cost products						3.51E-10 (2.89E-09)	
Payment in interests						-1.86e-08** (7.76E-09)	
Family expenses						9.26E-10 (7.68E-09)	
Other income						1.88e-09* (1.07E-09)	
Collateral value						-1.18e-09* (6.53E-10)	
Collateral granted						4.60e-09*** (8.94E-10)	
Agricultural firm	0.218*** (0.0103)	0.220*** (0.00999)	0.255*** (0.0144)	0.186*** (0.0579)	0.171*** (0.058)	0.167*** (0.0581)	0.156*** (0.0583)
Observations	59,463	59,463	59,463	59,463	59,463	59,463	59,461
R-squared	0.019	0.019	0.068	0.072	0.095	0.095	0.097

Credit access determinants using RoA as explanatory variable

The table below reports the results of the estimation regressing credit access on different KPI measures. Clients with higher ROA present better credit access in terms of both lower difference between applied and disbursed loan amount and loan size. However, the very small r-squared suggest that the models have no high explanatory power.

Table 24: Credit access determinants using RoA as explanatory variable

VARIABLES	(1) Difference applied-disbursed	(2) Waiting time	(3) Loan size
<i>ROA_{a1}</i>	-4,498** (1,860)	-9.66e-05 (0.000117)	0.0181** (0.00706)
Observations	59,461	59,461	59,461
R-squared	0.001	0.000	0.080
Family	NO	NO	NO
Loan	NO	NO	NO
Firm	NO	NO	NO
Branch code FE	NO	NO	NO
Other income	NO	NO	NO
Income NOa1	NO	NO	NO
Income a1	NO	NO	NO

Robust standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Annex 4 Interview Questionnaire

Objective: determine if clients with agricultural businesses could become more profitable by using extension services

Block 1 - Your farming business

- 1 How has your farm grown or changed over the last five years? The last ten years?
- 2 Have you previously received agricultural extension services?
- 3 Where do you currently get your seeds from, and (if used) fertilizer?
- 4 If any, which higher quality inputs would you like to use (fertilizer, seeds, light machinery, etc.)?
- 5 Do you have access to these inputs?
- 6 Are they of high quality?
- 7 Are they affordable?
- 8 Why don't you use them now?
- 9 Would you be willing to try one of these inputs if it was cheaper? Or would prefer to use the money for planting cash crops?
- 10 Which farming methods do you currently use for rice and cash crops, and where did you learn them?
- 11 Under which circumstances would you be willing to try new methods?
- 12 Do you have access to uncultivated land you could begin to plant if you had higher yields/more money?

Block 2 – Your finances and plans

- 13 What did you/do you use your ABM loan for? What are your financing plans? Size, duration,
- 14 Do you use a storage loan? Why/why not?
- 15 Size of loan- would you have wanted a larger one or no need?
- 16 Any need for a (shared) fixed asset?

Block 3 – The additional cost of banking

- 17 How long does it take you to travel to a branch/to make repayments?
- 18 How much does it cost you?
- 19 How much time do you spend traveling to the branch, and can you quantify this in terms of lost income, related to the loan duration (e.g. 6 half days)?
- 20 FOR LOAN OFFICER: how much would it cost a farmer at the edge of your zone?

Block 4 – Other financial services and use of a mobile phone for farm support and banking

- 21 ABM bank also offers savings services, do you use them, and could you save more if...?
- 22 Have you heard about insurance and would you use that?
- 23 Mobile-phone –based payments, or market data
- 24 What would you need/like to learn for using such services?

Annex 5 Detailed Interview Findings

	Day 1- agro loan clients			Day 2- chicken farmers with micro loans		Day 3- agro loan clients	
	Anthony	Benjamin	Catherine	Diana	Eric	Francesca	Grace
Business type:	Primarily rice, plus several other crops	pigs plus multi crop	multi crop	broiler chickens, plus other sources of income (breeding dogs and making pasta)	egg chickens	multi-crop farmer, plus milk cows	Primarily rice, plus several other crops, plus other sources of income (pension, micro business)
Farming business							
Has your farm grown in last 5-10 years?	yes	yes	yes	yes	yes	yes	yes
How?	Bought land, got land via marriage, bought farm assets	Bought land, constructed a barn for pigs	bought land	Started raising broiler chickens. She does this because it's complementary to the pasta business.	He bought many more chickens, has taken 2 previous loans.	She bought land, changed to SRA farming, got milk cows	change to SRA farming
Have you previously received agricultural extension services?	no	no	yes	no	no	yes	yes
From which organization?	n/a	n/a	Agrisud. They now have baby fruit trees	n/a	n/a	government	government
Where do you get seeds from	raises seeds himself, 3 types	grows himself	she grows them herself and her and her neighbors exchange seeds to increase productivity	She buys pre-made feed at a local shop (Lavishop).	He purchases inputs to make chicken feed in Mahitsy at a boutique. Is cheaper than buying pre-made feed.	Antsirabe (closest town)	Antsirabe (closest town)
Why?	He stated that he is very knowledgeable in this area, and knows that his seeds are high quality.	Because it usually works well. Only buys them if his don't turn out well for a season	Can do it well herself	Because of the quality. The shop also supplies her with chicks, pre-vaccinated.	Likes the quality plus has a variety of chickens	Better price and quality than village shop	Better price and quality than village shop
Price ok?	The price of fertilizers is high, has gone up recently. He purchases his in Analavory	The price of fertilizers is a bit high	too high	high	Okay.	bit high	bit high

	Day 1- agro loan clients			Day 2- chicken farmers with micro loans		Day 3- agro loan clients	
	Anthony	Benjamin	Catherine	Diana	Eric	Francesca	Grace
	(closest large town).						
Quality?	good	good	He doesn't know for seeds, but stated that it is high for fertilizers.	very good	good	good	good
Do you use fertilizers/seeds for rice?	yes, (but insufficient amounts)	yes, (but insufficient amounts and only organic)	yes, both chemical and organic (but insufficient amounts)	n/a	n/a	yes bc SRA system requires it	yes bc SRA system requires it
Do you use fertilizers/seeds for other crops?	yes, (but insufficient amounts)	yes, (but insufficient amounts)	no, not needed	n/a	n/a	no because not needed (false)	yes
Would you want to use more inputs if cheaper or better quality?	no, it would destroy the soil (false)	no, it would destroy the soil (false)	maybe but thinks current way is ok	n/a	n/a	no, not needed	no, not needed
Where did you learn your farming methods?	parents	parents	parents	friends	dad	parents + government extension services	parents + government extension services
Is land available for purchase, should you want to?	yes	yes	yes	yes	yes	yes	yes
Would you be interested to receive (additional) extension services?	yes	yes	yes	n/a	yes, but not needed	yes	yes in theory, but no need

	Day 1- agro loan clients			Day 2- chicken farmers with micro loans		Day 3- agro loan clients	
	Anthony	Benjamin	Catherine	Diana	Eric	Francesca	Grace
Notes	<p>This client has more assets than most of LO's clients. He also gains certain economies of scale by cultivating so much land (according to LO).</p> <p>LO mentioned that Agrisud and BVPI have been active in this area providing extension services</p>	<p>Client sometimes rents additional land to cultivate. Sometimes uses chemical fertilizers (just not for rice), which he buys in the market from a variety of suppliers</p>	<p>This client also grows sugar cane because it is easy to cultivate and easy to sell</p>	<p>Her supply store offers credit to customers but she doesn't take it. Said she sells much higher quality chickens than competitors because uses costlier inputs, but for the same price. She doesn't raise the price because she still makes a margin and has high sales.</p> <p>Client isn't interested in expanding the business at present because she would have to hire additional employees, make a big investment, not sure if she can manage it all.</p>	<p>He buys the chicks at a store in town, same store for 7 years. The store does not offer credit. He also has a small store/micro business</p>	<p>The soil in this region is not very fertile, it requires fertilizers. Client takes some advice from LOs, but in general has quite bad farming habits. Uses different fertilizers but not in the right amounts or at the right times. (Carrots looked poor). This is partly because she wants to minimize costs, but also because she lacks the technical knowledge. Most of her revenue comes from milk cows, but she underfeeds them because feed is expensive. as a result she only gets around 18 liters of milk from her two cows per day, rather than 40. She also uses some of her own crops to feed the cows. She has a much diversified farming system. Rice for self-consumption only.</p>	<p>Client used traditional rice farming methods until 3 years ago when government extension services came. Training took 2 days per person in the field. She and almost everyone she knows changed methods because it was clearly superior</p>
Finances and plans							
What did you use your ABM loan for?	Working capital and land purchase	Working capital	Working capital plus renting land	Salary	Fixed asset investment	Working capital plus land purchase	Working capital

	Day 1- agro loan clients			Day 2- chicken farmers with micro loans		Day 3- agro loan clients	
	Anthony	Benjamin	Catherine	Diana	Eric	Francesca	Grace
Have you previously taken a storage loan?	No	Yes with CECAM- not satisfied	Yes, with CECAM but wasn't happy, will use ABM when this branch starts offering	n/a	n/a	N/a (not the region-farming is more diversified in this zone)	Yes, but not with ABM. Depending on how low the price of rice is/her upcoming spending needs she takes it some years but not others
Would you have wanted or needed a larger loan?	Yes but was denied because of repayment capacity	Yes but was denied because of repayment capacity	No	No	Yes but didn't have repayment capacity	Yes but doesn't have the repayment capacity	Yes but doesn't have the repayment capacity
Any need for fixed assets?	Yes, zebus so he doesn't have to rent them (lower op costs).	No, is satisfied with his 4 zebus and charue	2-3 more zebus	Yes, a machine for milling grains/making pasta	Yes, a new milling machine to make feed	Yes, a zebu and charues to lower op costs	Yes, she wants to start raising zebus and buy a charue
Notes/observations:	Already purchased charues. Also invested in a moto pump for irrigation. Wants to continue to expand business so he can buy a house in Analavory and send kids to good schools. Future plans are buying more land for cultivation.	Client has a large revenue stream from tomatoes.	Client already has a zebu and 2-3 charues. Uses time she goes to make loan payments to make purchases for the house/stock up on inputs.	Previous loans were used for the purchase of chickens and to construct the buildings to house them in.	Client will use loan to finance a sprinter van, which he will use to both reduce operating costs (transport eggs himself from Mahitsy to tana) as well as to start a taxi service (new line of business). Presently pays 30k to 90k MGA in weekly transport costs to Tana	Said she'd rather buy assets such as bicycles, TVs, etc., then save in a bank, simply because it's their custom.	Slightly atypical- is a pensioner who lives in town rather than by the rice fields. Also more educated.
Additional cost of banking							
How long does it take you to travel to the branch for repayments (roundtrip)?	.5-1 day (taxi vs walking)	.5 day	.5 day	1 hour	1 hour	.5 day	.5 day
How much does it cost you (roundtrip)?	10,000 ariary or free	2000 ariary	10,000 ariary	free	1,000 ariary	5,000 ariary	4,000 ariary
Asked LO: how much would it cost for in gas for travel to edge of your zone (roundtrip)	same as above			-	-	12,000 ariary	

	Day 1- agro loan clients			Day 2- chicken farmers with micro loans		Day 3- agro loan clients	
	Anthony	Benjamin	Catherine	Diana	Eric	Francesca	Grace
Other financial Services							
What are your current methods of savings (if any)?	Buying land and/or saving additional rice	Buying more pigs or land	Buys more land or zebus	Investments into furniture, household items, as well as a savings account at Bank of Africa	Invest into furniture for house, sometimes land. Also save with a local savings cooperative	Buying items (see note above)	None (in reality home investments)
Would you be interested in a savings account with a FI?	Maybe	Maybe	Maybe	Already has one	Already has one	No	No
Have you ever heard of, and would you be interested in, agricultural or life insurance products	Never heard of insurance	Never heard of insurance	Never heard of insurance	Never heard of insurance	Never heard of insurance. Also stated that he would be afraid that with such a product he would have to formally declare income and then pay taxes.	Never heard of insurance	Never heard of insurance
Do you own your own cell phone, and do you have access to a network in your village/community?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Notes	Client seemed to have fewer unproductive assets/irregular expenses (TV, etc.) than other clients	Client said interest rates are the most important factor for him re: products	Client said she would be happy to learn more about other products as well as get training on techniques		Client prefers local coop to ABM savings account because it comes in a little book where the amount is written down.		

Annex 6 Client Case Studies

Client Overview					
Name	Anthony	Benjamin	Catherine	Francesca	Grace
Rice Fields (hectares)	6.8	3	1.5 ⁴³	.24	1.8
Other Areas Cultivated (hectares)	3.3	1.9	1.8	.97	3
Primary source of revenue (50%+)	Paddy	Tomatoes	Onions, Manioc	Dairy farming	Paddy
Additional sources of revenue	Chickpeas, beans, onions, manioc, pigs	Pigs, paddy, beans, manioc	Paddy, sugarcane	Carrots, beans, fish, corn, paddy, potatoes	Corn, beans potatoes
Farming Methods:	Traditional	Traditional	Traditional	Traditional, except for rice (SRA system)	SRA system ⁴⁴
Farm Performance (real)					
Profit Margin, all farming activities	57%	57%	80%	67%	57%
Profit Margin, paddy	55%	60%	68%	n/a ⁴⁵	52%
Profit Margin, primary activity (if it is not paddy)	--	70%	85%	81%	--
~Annual Net Revenues, all farming activities (EUR) ⁴⁶	€2220	€4430	€2340	€3590	€866 ⁴⁷
~Annual Net Revenues, paddy	€1200	€1160	€780	n/a	€360

⁴³ In the case of this client, rice was also cultivated on a sloped, less-fertile area of land known as 'tanety'. However, due to the very low yields of this type of terrain ¼ to ½ the yield of a rice field) even with recommended levels of inputs, this was not considered in the numerical analysis.

⁴⁴ System introduced by government extension services several years ago that consists of careful nursing of seedling rice plants for eight days before they are replanted.

⁴⁵ Paddy for own consumption is not sold.

⁴⁶ Annual net revenues before interest payments and family expenses, and not counting additional sources of income. It is important to note that family expenses are essentially operating costs due to the participation of the family in crop cultivation. Annual revenues for the client are therefore lower in reality.

⁴⁷ Primary source of revenue for this client is a microenterprise.

Annex 7 Cost of Paddy Production

The following table uses the actual input and output amounts of each farmer for his primary rice harvest, multiplied by the median unit costs and prices found among the case studies. As such, the financial figures are representative but not actual. Actual figures for annual paddy revenues can be seen in Annex 3, as well as in the individual case study documents provided in Excel format.

Costs per ha (EURO)							
	Unit costs (EUR)	Anthony	Benjamin	Catherine	Francesca	Grace	Agro Institute guidelines
Paddy per Hectare		2,378	3,267	3,461	1,875	1,600	6,500
Man days per hectare	0.87	103.79	80.04	145.62	130.50	101.50	174.00
Uree Per hectare	0.57	8.82	-	-	-	-	39.59
man days with zebu per hectare	1.74	33.92	20.88	50.60	-	-	-
NPK per hectare	0.58	16.96	-	-	-	-	174.00
Seeds per hectare (kgs)	0.23	-	24.75	-	-	-	0.12
Cost of Insect per harvest per hectare	4.83	-	-	-	-	4.83	2.42
Organic fertilizer	2.03	-	-	-	-	0.01	-
Additional	-	-	-	13.92	-	-	-
Total costs	-	163	126	210	131	106	390
Total costs per kilo of paddy	-	0.07	0.04	0.06	0.07	0.07	0.06

Net revenues per hectare (EURO)							
	Unit costs	Anthony	Benjamin	Catherine	Francesca	Grace	Agro Institute guidelines
Paddy (kgs)	0.20	466	639	677	367	313	1272
Operating Costs		163	126	210	131	106	390
Net revenues		302	514	467	237	207	882

Annex 8 Agricultural Production Index of Bevala

TABLEAU RECAPITULATIF PAR FILIERE											
	Semence	NPK	uree	Traitement	plantation	sarclage	recolte	duree culture	Min	Max	saison
AIL	600	150	0	0	140	30	15	4 à 5 mois	3,000	5,000	Intersaison et contre saison
HARICOT	100	150	0	1	90	30	7	3 mois	2,000	3,000	Grande saison
HARICOT VERT	100	300	750	1	90	30	25	1.5 mois	10,000	20,000	Grande saison
MAIS	100	100	50	6	140	30	12	4.5 à 5 mois	3,000	5,000	Grande saison
POMME DE TERRE	2000	300	75	0.8	115	20	5	2.5 à 3.5 mois	10,000	25,000	Contre saison
CAROTTE	600	100	0	0.6	30	52	7	3 à 3.5 mois	15,000	25,000	Intersaison
CHOUX	6	300	75	1	120	45	60	3.5 mois	20,000	50,000	Grande saison
OIGNON	0.6	300	75	0	120	45	15	6 à 7 mois	5,000	30,000	Contre saison
TOMATE	0.5	300	75	0.8	130	70	50	90 à 150 jours	5,000	20,000	Contre saison
RIZ	0.5	300	70	0.5	140	40	20	90 à 150 jours	3,000	10,000	Grande saison
ANANA	indefinie	0	250					1,5 à 2	indefinie	indefinie	Toute

BE RAVINA								mois après repiquag e			l'année
CRESSON	indefinie	400	200					2 mois	indefinie	indefinie	Toute l'année
SOJA	60	150	50					5 mois	1,000	2,000	Grande saison
CHOUX FLEUR	indefinie	40	30					3 à 5 mois	indefinie	indefinie	Contre saison
ORGE	150	400	200					4 à 5 mois	4,500	7,500	Contre saison

Annex 9 Overview of Products of FIs

The below table provides details on the financing conditions of all financial institutions considered to be primary competitors of ABM for providing financial services to the rural population. Effective Annual Interest Rates (EAIR) were calculated using the 'Calculating Transparent Pricing Tool'⁴⁸ put forward by the organization mfttransparency.org, and using the loan durations indicated in the table⁴⁹. Currency used is MGA.

Product Type		Name of Financial Institution						
		ACCESBANQUE	MICROCRED	Adéfi-ACEP	SIPEM	PAMF	OTIV	CECAM
OTHER	<i>Insurance</i>		0.618%	0.75%	0.684%			
	<i>Forced Deposit</i>		One installment as deposit				forced deposit of 20%	24,000 AR forced deposit for max, for min a similar percentage was assumed
Micro loans- average duration 12 months	min amount	500,000	200,000	200,000	200,000	100,000	100,000	200,000
	max fee	2.40%	2.40%	0	5.00%	1.20%	3.50%	3%
	max monthly interest	3.75%	3.75%	1.75 FLAT	2% flat	flat 1.5%	Flat 1.5%	4.00%
	APR	49.26%	58.38%	36.82%	51.27%	33.00%	55.53%	53.78%
	Max EAIR	64%	79%	44%	67%	39%	74%	71%
	max amount	20,000,000	20,000,000	16,500,000	20,000,000	20,000,000	1,000,000	6,000,000
	min fee	1.20%	1.20%	0%	MGA 504,000	2.40%	3.50%	3%
	min monthly interest	3.35%	3.25%	1.75 FLAT	2% flat	Flat 1.5%	Flat 1.5%	3.50%
	APR	42.13%	48.85%	36.82%	46.22%	35.34%	55.53%	47.87%
	Min EAIR	52%	63%	44%	59%	42%	74%	61%
	<i>other fees</i>		Life insurance: 0.618%	.75% life insurance	0.684%		forced deposit of 20%	NONE
SME loans- average duration 12 months	min amount	20,000,001	20,000,001	16,500,000	20,000,000	20,000,000	60,000	
	max fee	2.40%	1.80%	0.00%	MGA 504,000	2.4%	3.50%	
	max monthly interest	3.0%	3.0%	1.75%	1.75%	Flat 1.3%	Flat 2%	
	APR	40.43%	46.93%	36.82%	41.63%	31.5%	68.10%	
	EAIR	50%	60%	44%	52%	37%	97%	
	max amount	100,000,000	200,000,000	120,000,000	40,000,000	40,000,000	1,000,000	
	min fee	1.20%	1.20%	0.00%	MGA 504,000	2.4%	3.50%	
	min monthly interest	2.20%	3.00%	1.58%	1.25%	Flat 1.3%	Flat 2%	
	APR	28.57%	45.51%	33.65%	29.64%	31.5%	68.10%	
	EAIR	33%	58%	40%	34%	37%	97%	
	<i>other</i>	10-12 months, with 3-4 months grace. Interest (roughly) is paid during grace	NONE	NONE	NONE	NONE	forced deposit of 20%; payment period unknown, assumed to be like ABM for sake of being conservative	10-12 months, with bullet payment principal, interest payment along the way

⁴⁸ Available at: <http://www.mfttransparency.org/resources/calculating-transparent-pricing-tool/> (31.03.2017).

⁴⁹ These maturities were selected based off the average term for each product type. Terms, and therefore EAIRs, vary from bank to bank and product to product.

Product Type		Name of Financial Institution							
		ACCESBANQUE	MICROCREC	Adéfi-ACEP	SIPEM	PAMF	OTIV		
Agricultural loans: Working capital- average duration 12 months	min amount	400,000							
	max fee	2.40%					3.50%	2.50%	
	max monthly interest	5%					flat 1.5%	3.00%	
	APR	62.87%					40.24%	38.64%	
	EAIR	87%					50%	47%	
	max amount	15,000,000					1,500,000	4,000,000	
	min fee	1.20%					3.50%	2.50%	
	min monthly interest	3.75%					flat 1.5%	3.00%	
	APR	46.29%					40.24%	38.72%	
	EAIR	59%					50%	47%	
<i>other</i>	6-9 months with bullet payment at end	Life insurance: 0.618%		NONE	NONE	6-9 months		6-7 months with bullet payment at end	
Agricultural loans: crop storage- estimated at 6 (min) and 9 (max) months	min amount	550,000	1,000,000			600,000	550,000	550,000	
	max fee	2.40%	2.4%			1.00%	3.5%	3.00%	
	max monthly interest	3.75%	3.25%			1.8% FLAT	flat 2%	3.00%	
	APR	45.58%	45.70%			22.72%	37.22%	39.69%	
	EAIR	58%	58%			25%	45%	49%	
	max amount	20,000,000	200,000,000			20,000,000	not given-ASK	40,000,000	
	min fee	1.20%	1.20%			1.00%	3.5%	3.00%	
	min monthly interest	3.35%	3.00%			1.8% FLAT	flat 2%	3.00%	
	APR	36.86%	37.40%			21.42%	33.13%	36.18%	
	EAIR	45%	45%			24%	39%	44%	

Annex 10 Development Programs Supporting Rural Finance in Madagascar

Development Agency	Program name/place	Objective /beneficiaries	Components
IFAD (see para 99. 21- IFAD Report)	FORMAPROD		3.1 Grants for group projects (up to 2,000 USD for a group of 10), and group projects for 5- 10 persons each receiving 300 USD 3.2 Facilitation of adapted financial services
	ADM2M-II Menabe and Melaky	Smallholder families to improve agricultural production and marketing	<ul style="list-style-type: none"> • Land tenure and land rights • Organizing smallholders • Establishment of credit unions
	PROSPERER ⁵⁰	Rural Microenterprises	
GIZ			To complete
AFD			
World Bank	Food Security		

⁵⁰ Co-financiers are OFID, IFAD, UNCDF, beneficiaries, governments, IFAD (KfW is a co-financier of OFID, the OECD development organisation).

Annex 11 CABFIN Guidelines: Subsidies as Instrument in Agricultural Finance

The following general guidelines for “**smart or market-friendly subsidies**” emerge from this summary of subsidy issues:

- Subsidizing the institution but not the borrower is the best way to reduce distortions even if this implies a degree of direct subsidy to borrowers.
- Projects to subsidize selected institutions should explicitly consider the interest rates to be charged relative to competing institutions so the subsidies do not undermine competition.
- Subsidies that successfully create public goods for the benefit of the entire financial sector may generate higher returns than subsidies for specific institutions because no single institution can justify making the investment alone when the benefits accrue to many.
- Subsidies for institution-building of individual financial institutions are easier to justify if there is a natural positive spill-over to nonsubsidized institutions. Subsidies to finance innovations created through networks of financial institutions may be preferred because of the likelihood that the benefits will be spread among all members.
- Indirect subsidies that benefit many borrowers may generate more total benefits than direct interest-rate subsidies to borrowers.
- Quantitative performance measures should be included in project agreements so subsidies to financial institutions do not dull incentives for achieving high performance levels. For this reason, subsidies need to be time-bound with explicit exit strategies specified for the supplier of the subsidies.
- Comparative cost-benefit studies are needed to identify which subsidies generate the greatest payoff in practice.
- Recipients of grants should provide matching cash or in-kind contributions to demonstrate their commitment to the projects funded.
- The provision of grants to financial institutions should be designed so recipients clearly understand the difference between grants and loans that need to be repaid.

From: Subsidies as an instrument in Agriculture Finance: A review for World Bank (R. Meyer) BMZ, FAO, GIZ, IFAD and UNCDF (2011).

Annex 12 Details of Promotional Instruments

Financial sector support instruments in detail

1 - Credit Lines are concessional or market-priced lending facilities. They can be placed in a certain type of borrowing entity or pursue a certain sector development goal such as developing a client segment or region.

In terms of their objective, credit lines respond to the challenges on the funding side of a MFI or bank. Credit lines are particularly relevant for non-deposit taking MFIs as they often have no constant and reliable source of funding. A credit line, however, can respond to a certain desired public policy goal, be it environmental investments, enterprise promotion or agricultural investment. Related to the latter, if short in liquidity, Financial Institutions (FIs) have the tendency to invest into low-risk and high-return projects. As a result, investments into the perceived high-risk agricultural sector are often avoided, or are simply not feasible due to a lack of funds.

The availability of a refinancing facility for lending to smallholders therefore provides an attractive option to encourage agricultural lending. Credit lines can come as a stand-alone facility for one FI, or address several FIs, in which case they are managed by an experienced manager, such as the Central Bank, an apex bank, a commercial bank, or another national financial services provider.

2 - Credit Guarantees can either be provided by a guarantee facility, or be managed as a sole-standing operation to a single FI. Credit guarantees do not extend any direct lending to enterprises; rather, their role is to ease the interaction between businesses and the formal financial institution by covering part of the default risk that is associated with the lending operation. By covering part of the expected losses of a single loan or a loan portfolio, lending to more difficult target groups or riskier ventures can be supported. At the same time, the financial institution can learn how to assess the actual risk level of lending for the particular group.

The objective of credit guarantees is to facilitate access to loans for a selected group of credit-takers. The loan operation is made by a formal FI, which uses the guarantee as a (partial) substitute for collateral. The guarantee is usually needed in the case when either no (adequate) collateral can be offered to the financial institution, or the risk of lending to a client is perceived as too high by the lender.

3 – Equity Investments in FIs can be placed in a retail FI, a whole-sale or apex FI, or a group of FIs organized in a holding. They can come as direct investment in a single FI or via a national or global

Regional or global special purpose funds operate in various countries. **Regional Funds** are those such as SANAD (a fund to promote small enterprise finance in the MENA Region). Among the **Global Funds** there is for example “Leapfrog” for inclusive insurance; or the Climate Insurance Fund (CIF) for climate-sensitive insurance solutions. These funds can either be directed at one or several of the following criteria:

- a) **Funds for specific types of FIs:** Microfinance Investment Vehicles such as “ResponsAbility”, or “Blue Orchard”; some have TA facilities
- b) **Funds for specific financial services:** insurance, payments
- c) **Funds for specific development agendas:** green finance, enterprise development, agriculture, or climate change
- d) **Funds for specific client types:** for the “African Agriculture and Trade Investment Fund” for small farmers.

These funds either focus solely on **the financial system, or they include other policy areas** (e.g. trade, energy, enterprise promotion, agriculture). Their entry points are the meso-level (wholesale or apex function, e.g. when supporting a financial literacy campaign with the Moroccan Foundation for Financial Education), the micro-level (retail finance businesses), the client level, or a mix.

investment vehicle. They are intended to capitalize the equity base of the institution, for on-lending, guarantees, pilot projects, physical investments such as branch networks or MIS systems, a formalization process to get a formal microfinance or banking license, or simply, for pooling resources for a given development objective in the financial sector or beyond (Example: Lok Capital India – national fund for equity investments).

The objective of an equity investment is to capitalize the FI and allowing for the growth of its business, while at the same time participating in the governance of the FI and receiving a return on investment.

4 – Technical assistance (TA) operations intend to improve the capacity of the FI or of several FIs. They can either support single FIs, or follow a transparent process to select partners that qualify for support. TA often comes in the form of “matching grants” which are non-refundable capital injections for capacity building or physical investments to a single financial or sector institution, or to a non-financial stakeholder.

In terms of their objectives, TA support is directed to improve organizational capacities (staff training, improving the credit technology or IT/MIS systems, funding of equipment, branches or other outlets), client capacities (facilitating communication with the client, supporting client training) or facilitating business partnerships. They can fund “public goods” such as financial education, or the provision of market or weather data. Last but not least, grants can fund branchless banking; or strategic alliances between FIs and MNO (mobile wallets for savings and loan repayment).

TA is often provided by a “Challenge Fund” which is a sector development instrument, seeking to advance a national development purpose. In the case of agricultural finance these purposes can, for example, be related to a certain region, a type of smallholder, green investments, or to certain value-chains. They are managed by a national partner or international firm that is providing technical assistance grants for FIs for the specific purpose, e.g. facilitating lending to a determined purpose or groups of borrowers, organizational development of FIs, staff development or out-branching. They are capitalized by a single donor, but can also be a multi-donor fund. Examples include Access to Finance Challenge Fund in Mozambique; Microfinance Challenge Fund Ruanda.

5 – Public goods can be provided as sector support by contributing to national or regional multi-donor programs. The main fields they generally support are research of topics regarding clients, institutions, strategies or concepts; enabling environment such as regulation and supervision and public policies; market development strategies; sector dialogue and financial education.

The objectives of the public good type of support include developing sector-wide topics, funding areas for which the private sector would hardly pay in full or in which the government would not invest. Often public-good investments are co-funded together with private partners or the government.

This kind of support is often managed as a program and relies on inputs from several development partners. In some cases, the program is legally incorporated as a trust fund or foundation (example Financial Sector Deepening Trusts in Tanzania, Kenya, Nigeria and Mozambique).

Imprint

Publisher
KfW Group
KfW Development Bank
Palmengartenstrasse 5-9
60325 Frankfurt am Main, Germany
Telephone +49 69 74310
Fax +49 69 7431 2944
info@kfw-entwicklungsbank.de
www.kfw.de

Editing
Competence Centre Sustainable Economic
Development, Education and Health

Photos
Source: Fotolia.com, photographer: dr322