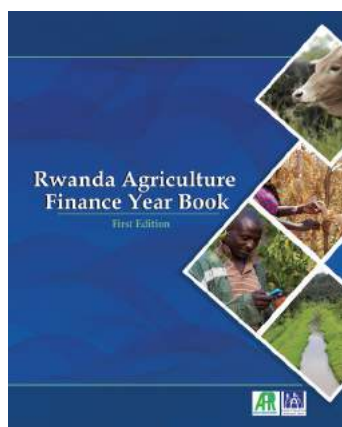


Rwanda Agriculture Finance Year Book

First Edition





Acknowledgement

The Agriculture Finance Year Book First Edition was compiled by the Institute of Policy Analysis and Research (IPAR-Rwanda) with a grant from Access to Finance Rwanda (AFR).

Disclaimer

The views expressed in this book don't necessarily represent the views of IPAR-Rwanda and AFR about Agriculture Financing in Rwanda.

Published by



The Institute of Policy Analysis and Research (IPAR-Rwanda)

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Foreword

Agriculture is essential for the Rwandan economy as it contributes to a third of the GDP. The sector employs more than two thirds of the workforce and agriculture led growth is expected to play a key role in reducing poverty and eradicating extreme poverty.

The Government of Rwanda is committed to transforming agriculture from subsistence to a productive, high value, market oriented farming sector which has an impact on other sectors. This will be achieved through several programs implemented through the Ministry of Agriculture and Animal Resources (MINAGRI) and its agencies but also with the help of the private sector, development partners and other key stakeholders.

To sustain growth, there is need for farmers to move from subsistence farming to commercial farming, which is possible when they have adequate access to financial services. Finance is needed along the whole production value chain such as purchase of quality seeds and adequate fertilizers, payment of labor, harvesting and transportation of produce as well as post-harvest handling.

However, even though access to finance is important for agriculture sector development in Rwanda,



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credit to the sector remains outstandingly small at only 6% of total commercial lending. This limits the sector's growth potential.

Recognizing that the agriculture sector faces critical challenges such as access to credit and having in mind efforts by different actors both private and public, led by the Government of Rwanda, Access to Finance Rwanda (AFR) and the Institute of Policy Analysis and Research (IPAR) Rwanda partnered to put together the Agriculture Finance book. The book, the first of its kind in Rwanda, is a great source of information on financing, innovations, challenges and learnings with regard to agriculture financing in Rwanda.

We believe the Agriculture Finance book will add great value to existing initiatives geared towards improving the agriculture sector. It is our sincere hope that the information contained in this book will particularly be useful to farmers, financial institutions and policy-makers.

We thank everyone who contributed their time and effort in one way or another, leading to the successful compilation of the book.

Thank you and enjoy reading!



Ms. Waringa Kibe

*Country Director
Access to Finance Rwanda (AFR)*



Acronyms and Abbreviations

AFR	Access to Finance Rwanda
AMIR	Association of Microfinance Institutions in Rwanda
BDF	Rwanda Business Development Fund
BNR	Banque Nationale du Rwanda (National Bank of Rwanda, Central Bank)
BPR	Banque Populaire du Rwanda
BRD	Development Bank of Rwanda
CEPAR	Coffee Exporters and Processors Association of Rwanda
CIP	Crop Intensification Program
CWS	Coffee Washing Stations
EAX	East African Commodity Exchange
EDPRS	Economic Development and Poverty Reduction Strategy
EICV	Integrated Household Living Conditions Survey
FIs	Financial Institutions
GDP	Gross Domestic Product
KCB	Kenya Commercial Bank
MFIs	Microfinance Institutions
MINAGRI	Ministry of Agriculture and Animal Resources
MINECOFIN	Ministry of Finance and Economic Planning
MINICOM	Ministry of Trade and Industry
NAEB	National Agricultural Export Development Board
NAP	National Agriculture Policy
NFIS	National Financial Inclusion Strategy
NISR	National Institute of Statistics of Rwanda
NPL	Non-Performing Loan
PSTA	Strategic Plan for the Transformation of Agriculture
RAB	Rwanda Agriculture Board
RCA	Rwanda Cooperative Agency
RDB	Rwanda Development Board
Rwf	Rwandan franc
SACCOs	Savings and Credit Cooperatives
SMEs	Small and Medium-sized Enterprises
SNS	Smart Nkunganire System



BACKGROUND



Agriculture is the most important sector of the economy of Rwanda. Eighty six percent (86%) of the adult population is involved in agriculture whether as its main source of income or employment. Since 2014 agriculture has a growth of six percent (6%) and in the last quarter of 2018, it contributed twenty seven percent (27%) to Rwandan GDP. The agriculture sector growth is hence essential if Rwanda wants to achieve its target set in NST 1 and national development programs. The development strategy of the country acknowledges that together with the creation of off-farm jobs, agriculture will play a key role in reducing poverty and eradicating extreme poverty. Improved productivity along the value chain in agriculture directly benefit the poor. It is a pathway out of poverty. This is supported by the findings of a survey conducted by the International Food Policy Research Institute (IFPRI), which states that: "economy wide growth led by the agriculture sector has a greater effect on poverty reduction than does the same level of growth driven by the non-agricultural sector".

One constraint to the agriculture sector growth is the access to financial services. Financing Agricultural limits come from both demand and supply factors. On the supply side, lending to farmers or agri-business shares similarities to lending to other sectors. However, given its nature of agriculture it has some differences and lenders often do not understand these differences. For example, as agriculture is seasonal and deals with nature, loan repayment conditions need to take into account that cash flows are linked to the agriculture production cycle. Lenders must hence structure their products to meet the production cycle of the activity they finance. On the demand side, smallholders may not be aware of the financing possibilities or may not provide the adequate

guarantee. A big number of the farmers work in subsistence Agriculture and they are necessity entrepreneurs. If they want to become sale oriented and to grow, they have to borrow but they also have to save. Lack of information related to environmental risks, business capability of farmers, value chains, price risks, yields risks etc. creates market failures, which result in insufficient credit, low levels of investment and low productivity of agriculture.

The above is illustrated by the low level of loans to the Agriculture which account for only an average of 6.15 % ¹ of the total loans in the country (from September 2014 to march 2018) (BNR, 2018). Agriculture finance is a key challenge to enhance productivity in the sector and to reach the Rwanda targets in terms of growth, poverty reduction etc.

While various agriculture initiatives have been implemented by the Rwandan government, financial institutions, international development partners, non-governmental organizations and other associations, there is a need for a deep analysis and documentation of such initiatives. It is against this background that Access to Finance Rwanda (AFR) and the Institute of Policy Analysis Research (IPAR-Rwanda) collected and analysed agriculture financing initiatives in Rwanda which are compiled in the Agricultural finance Yearbook 2018. The have supported the Ministry of Agriculture and Animal Resources in collecting and sharing agriculture initiatives in Rwanda, through an agriculture finance Yearbook 2018. The book has been compiled and produced with collaboration of different agencies that are involved in the financing of different activities across the agricultural value chain.

¹ From both the banking sector and microfinance sector (MFIs and SACCOs).



Organizations that have provided valuable inputs in terms of quantitative figures on access to finance and the amount of agricultural credit that has gone to the different actors in the value chain include the National Bank of Rwanda (BNR), Rwanda Development Bank (BRD), and the National Institute of Statistics of Rwanda (NISR). Other organizations that have provided the case study experiences include Dairy cooperatives such IAKIB and National Agricultural Exports Board (NAEB), BK Techhouse in collaboration with the Rwanda Agricultural Board (RAB) have provided useful insights on the functioning of the “Smart Nkuganire platform” which will go a long way in de-risking agriculture in Rwanda and improving efficiencies in the distribution of inputs like seed and fertilizers in Rwanda. Although the information has been collected from different actors in agriculture financing chain, the experiences and lessons provided in this book will go a long way in improving the functioning and performance of the agriculture sector in Rwanda. This is because agriculture is a critical sector where all activities such land preparation, planting, agronomic practices, harvesting, post-harvest handling, market and export are all interlinked. Improved access to finance and credit drives all the above activities and cuts across all the activities in agricultural value chains. It is for this reason that the Ministry of Agriculture and Natural resources has endorsed the initiative and publication of the Agriculture Finance book.

The book with financial availability is planned to be published every year to ensure robust market engagement, continuous knowledge sharing and learning. This is intended to increase knowledge and good practices implemented in Rwanda in the area of agriculture financing.

The book provides a repertory of the past and expected trends in agriculture financing in Rwanda, and hence shows the actual priorities of the sector. The book also provides experiences and practical examples put in place by different types of actors in the sector. These experiences are actions taken by farmers, cooperatives, banks, private investors, public sector development partners. They showcase the environment of agriculture financing in Rwanda.

The Agriculture Finance Yearbook hence aims at sharing knowledge of existing trends and practices in Agriculture finance through a description of Agriculture financing trends and activities. The book therefore aims at informing all readers with interest in Agriculture Financing including decision makers, farmers, investors, consumers and development partners.

The book is structured as follow: section 1 consists of a mapping of the different agriculture finance mechanisms, the demand and supply agents in agriculture finance and the associated value chain, the market equilibrium characteristics and the regulation in the domain. Section 2 of the book describes Public finance environment in agriculture. It describes both the public income generated through taxation in the agriculture sector as well as the composition of government expenditure in agriculture. This will serve as the baseline against which the successive yearly publications of the agriculture finance book will describe the changes in incentives and priorities, according to the public finance of agriculture. Section 3 on field experience consists in describing and analysing agriculture credit products supporting the implementation of government programs and policies from the development Bank of Rwanda (BRD), the Business



Development Fund (BDF), insurance products of UAP Insurance and agriculture loan products from Urwego bank. Section 4 of the book presents innovative initiatives in Agriculture financing. More specifically, it describes how IAKIB managed to grow organically, presents digital solution from BK

TecHouse and KCB and lastly, it highlights the value chain financing in the tea and coffee sector from NAEB. Section 5 consists in the solution from EAX to address post-harvest losses. The last section uses quantitative methods to forecast production in the agriculture sector based on different indicators.



SECTION 1:

Overview of Agricultural Finance in Rwanda



1.1. Agriculture Policy Framework in Rwanda

A decade ago, Rwanda's priority as set out in the first Economic Development and Poverty Reduction Strategy (EDPRS-1) was for the agriculture sector to contribute in increasing and diversifying household incomes in a sustainable way while ensuring food security for the Rwandan population. However, in the EDPRS 2, the emphasis has shifted towards the need to modernize and commercialize the agriculture sector as well as to increase non-farm employment so as to free land for a scaled-up agriculture. Since the end of EDPRS 2, the Government of Rwanda has adopted a new National Strategy for Transformation (NST 1). Under NST 1 the goal is to achieve a 5.7% average growth of the sector. This to be achieved by; among other means; increasing agriculture productivity, quality and sustainability on key crops with increase of between 30% to 100% on various yields, double the credit to agriculture sector as a percentage of total loans from 5.2% (2017) to 10.4% in 2024 and by increasing irrigated land from 48,508 ha (2017) to 102,284 ha in 2024 (MINECOFIN, 2018)².

The transformation of agriculture into a commercialized sector is integral to the vision to transform Rwanda into a middle income country as set out in the country's long term development strategy, *Vision 2020*. The agriculture sector will be required to produce sufficient food to feed the population and to help narrow down the current food imports bill which contributes to the increase of the country's trade deficit.

Rwanda's vision is to transform agriculture from a labour intensive, low productivity and subsistence-based to a mechanized, highly productive commercial sector. The aim is to bring it to produce market niche produce for local, regional and international markets as well as food to feed a growing urban population. According to the latest Strategic Plans for the Transformation of Agriculture PSTA (IV), there are four strategic programmes in the agriculture sector:

1. Enabling environment and responsive institutions;
2. Productive and inclusive markets and value addition;
3. Increased productivity, diversity, sustainability and resilience of agricultural production; and
4. Research, innovation and empowerment.

Under this new PSTA the goal is to increase the Rwandan agriculture sector's productivity by investing in value addition and commercialisation. Especially small-scale farmers (as well as other value chain actors) are beneficiaries of Programme 2, social protection programmes and other measures in terms of skills development interventions, - and Programme 3, promoting small-scale irrigation and scaling up the Girinka program with small livestock (pigs, goats, etc.).

In terms of agriculture finance, in 2012 the Ministry of Agriculture developed the Rural and Agricultural Finance Strategy to guide agriculture financing especially in the rural areas. The strategy sets out five strategic options for improving access to finance in the agriculture sector which are as follows:

² MINECOFIN (2018). National Strategy for Transformation and Green Priorities. Presentation to Africa Green Growth Forum.



- i. Linkage banking and innovations to help formal financial institutions serve informal financial structures such as Village Savings and Loan Associations (VSLAs);
- ii. Collateral management and warehouse receipts;
- iii. The development of a credit information bureau and commodity exchange systems to deal with information gaps about small holder farmers;
- iv. Remote access banking; and
- v. Longer term finance

*(Rural and Agricultural Finance Strategy, 2012).

1.2. Dimensions to Agricultural Financing and Financing Mechanisms in Rwanda

According to the 2012 Rural and agricultural finance Strategy, there are three dimensions to agricultural finance in Rwanda, which correspond to three stages of the value chain. These include: (i) *primary production*; (ii) *marketing and trade*, and (iii) *post-harvest handling and agro-processing*. Actors in these three dimensions' access credit with varying levels of difficulty, depending on the risks involved at each stage of the value chain. The critical stages and riskier stages for agricultural finance are primary production and post-harvest handling; at these stages producers are exposed to various vagaries of nature. The financing mechanisms associated with these different dimensions are the following according to Le Tourioner (2011):

Chain liquidity: This involves financial transactions *between* agricultural value chain actors. It entails for instance a buyer or a trader extending a short term loan to a producer in lieu of farm produce

that has not been harvested. The trader is repaid once the farmer sells his/her produce to the trader who gave him/her the loan. This type of finance improves the efficiency of a value chain due the fact that it is a low-cost and efficient mechanism where in some cases a farmer does not incur interest charges to the trader. It is also a low risk mechanism since the trader and the farmer have information about each other. However, this mechanism relies heavily on trust and, therefore, tend to be limited to specific transactions and business purposes of the agribusiness companies (e.g. input distribution on credit to ensure supply of high-quality crops). In addition, in case farmers are not well organized and not many suppliers/traders it may lead to exploitation of farmers by traders, as it creates high dependency on the latter by the former.

Agricultural Finance: This is the most common financial service provided by financial institutions, including banks, Microfinance Institutions (MFIs) and Savings and Credit Cooperatives (SACCOs). Examples include a loan issued by a bank to a trader to buy crop, or a loan to a farmer to buy inputs. This mechanism suffers the challenges of information asymmetries between the lending institution and the farmer and requires collateral which farmers sometimes do not have.

Value Chain Finance: These are financial services established and anchored on the cooperation between agents along value chains and between them and a financial institution. An elaborate example of value chain finance is the E-Warehouse receipt system which is currently implemented by the East Africa Exchange in Rwanda (EAX). Here, EAX issues an electronic warehouse receipt to the farmer, which acts as a guarantee or collateral for a farmer who needs to get credit from a lender



affiliated with the EAX and/or from large off takers of the grain. In a way, the EAX provides the market to the farmers' grains through linking small farmers up with large off-takers. In addition, the EAX facilitates farmers' access to credit using the Electronic Warehouse Receipt (eWR) as a farmers' collateral at the bank. The eWR guarantees that the farmer has a stock of good quality maize which is well stored and ready for sale.

These type of financing mechanisms can be distinguished by the source of funds. In the case of a chain liquidity funds are raised within the value chain, for the agricultural finance mechanism finances come from outside the value chain and the value chain finance funds come from both outside and inside the value chain.

1.3. Agricultural Finance challenges in Rwanda

From the literature³, the following are the key challenges and bottlenecks within the agriculture financing in Rwanda. The challenges faced in the financing of agricultural value chains in Rwanda are both financial and non-financial. Financial challenges are mostly related to the limited access to credit by the actors in agricultural value chains while non-financial challenges are related to inadequacies of the value chain infrastructure and asymmetries of information between actors. Given that agricultural production systems entail a series of linked activities including input provision, training and extension services, marketing and post-harvest activities, information between the different actors who serve farmers need to flow freely and actions need to be aligned.

³ These challenges were retrieved from the Rural and Agricultural Finance Strategy (2012) and PSTA III & IV.

Breakdowns in information flow and coordination have negatively affected the success of financing and repayment of loans given to the agricultural sector.

1.3.1 Limited credit to the agriculture sector due to both perceived and actual risks in undertaking agricultural activities.

Although agricultural activities are risky, the lack of data on farmers' operations and the lack of knowledge on climate smart agriculture techniques limit agricultural insurance which would be a precursor to agricultural lending. The lack of data on farmers leads to high perceptions of risk in the agriculture sector, which exacerbate the finance challenge in the sector. Increased perceived risk in the agriculture sector needs to be demystified by providing timely data to financing institutions and building the capacity of lenders to align financing products to the agricultural cycles and the unique nature of agriculture. At the moment, the majority of financial products for the agriculture sector are tailored to the Small and Medium Enterprises (SMEs) microfinance models which do not necessarily correspond to the seasonal nature of agriculture.

1.3.2 Weak linkages and organization among value chain actors

Given that agriculture value chain finance involves more than just pumping money into the sector, it is important that actors within value chains are strongly linked and well organized. The existence of relatively weak linkages between actors along the value chains represents a major challenge to the development of the value chain finance in Rwanda. For instance, agricultural cooperatives that have been successful in attracting agricultural finance have organically grown over time and strong



collective actions in the production, marketing and value addition preceded access to finance. The organization of agri value chains is heavily dependent on the nature of the crops and markets. Dairy is a classic example of tightly managed value chains due to the nature of the product (i.e. highly perishable). On the other hand, crops such as maize usually form loose value chains with numerous producers and buyers. An example is the Gicumbi Dairy Cooperative which has organized dairy farmers within the area, trained them and engaged in collective marketing of their milk to the Inyange Industries. In addition, such cooperatives tend to take on a diversified portfolio of activities within the value chain including selling veterinary medicine, producing animal feeds and selling milk.

1.3.3 Inadequate post-harvest financing

Shortage of agricultural finance at the post-harvest stage is another major challenge faced by the agricultural system in Rwanda. Although limited agricultural finance is a key bottleneck for inputs at the primary production stage, finance is a much more important constraint at the post-harvest stage. This is due to the fact that post-harvest losses sometimes constitute over 30% of the losses incurred by farmers. This implies that initiatives such as the electronic warehouse receipt (eWR) system are key to reducing post-harvest losses.

1.3.4 Challenges related to value chain financing

In addition to challenges faced by farmers, there are bottlenecks related to different actors in agricultural value chains such as low trust among the actors across the value chain, a poor incentive structure for large off-takers of farming contracts

and limitations in warehouse receipt regulations. The low trust limits collective action in terms of farmers working together to produce high volumes, which would give them a better bargaining position regarding the price received for their crops. In addition, production in small quantities which is done at irregular time intervals makes the production less attractive for large off-takers to enter into contracts with farmers.

1.3.5 Agricultural finance supply challenges

The challenges related to agricultural finance supply include (i) inadequate availability of financial products to serve rural smallholders, (ii) insufficient competence by lending institutions in the sector (banks) to assess and manage risks and (iii) inadequate infrastructure of rural bank branches, which affects their ability to serve rural farmers. As a matter of fact, the supply is highly concentrated in urban cities such as Kigali, Rwamagana, Muhanga, Musanze, Rubavu and Rusizi.

1.3.6 Challenges associated with sector-wide impacts

The challenges associated with sector wide impact include the difficulties involved in financing low-value and bulky agricultural commodities, inadequate market information mechanisms and limitations in accessing markets. Other challenges include limitations in the private sector involvement and a market which is too small and too young for equity and debt instruments.

1.3.7 Challenges related to the agricultural finance demand

The challenges related to the demand arise from: i) the failure to present tangible collaterals to

financial institutions. However, this might also be because these financial institutions ask for more liquid collaterals, which creates a mismatch on the market; ii) low financial literacy level among value chain cooperative and farmers leading to a low awareness and usage of products on the market and iii) ineffective governance/management of cooperatives. Indeed, it is mostly the cooperative manager who requests for a loan on behalf of the cooperative with limited or no involvement of the members while the latter are the ones who will repay the loan.

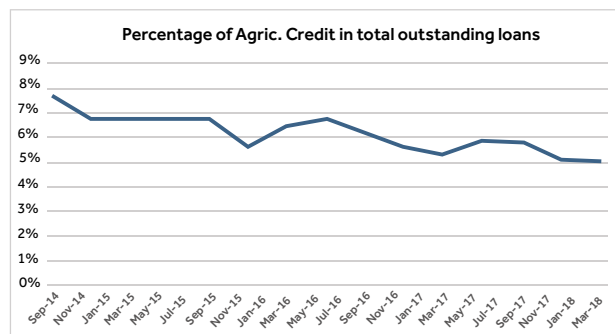
1.4. Access to financing in Agriculture

1.4.1 Credit demand

Based on the 2016 FinScope survey, about 86% of Rwandan adults are from households that are involved directly or indirectly in agricultural activities. Among this proportion of the population, heads of households and people who receive income from rural wage labour are classified as follows: i) 30% are subsistence farmers meaning that they are involved in self-sufficiency agricultural activities; ii) farm workers who basically receive an income from agricultural activities whether as the main or additional income also represent 30%; and iii) the number of commercial farmers who undertake agricultural activities as a commercial business is around 9%. Excluded in this segmentation are: 1) Those who are involved in agricultural activities but are not head of households and do not receive an income from rural wage labour, i.e. salary/wage from a farmer (17%) and 2) Those who are not involved in agricultural activities at all (14%). The majority of farmers in Rwanda are based in rural areas.

Overall farmers are financially included with inclusion ranges varying between 86% and 91%. The highly included farmers are farm workers with additional sources of income while the same category without an additional income are less likely to be financially included. The farmers who are involved in subsistence and commercial farming activities are mostly male, while farm workers are mainly female. Overall, farmers in Rwanda, especially farm workers and commercial farmers, are relatively young (i.e. ranges between 18 and 30 years). Subsistence farmers are usually older and have lower levels of education compared to other groups (i.e. ranges between 31 and 40 years), and most of them are heads of households. Nevertheless, agriculture loans from banks, Microfinance Institutions and SACCOs are still low compared to outstanding loans and has been decreasing from the past four years.

Figure 1: Percentage of agriculture loans in total outstanding loans



Source: BNR (2018)

The latest Integrated Household Living Conditions Survey (EICV⁴), which was conducted in 2013/2014,

⁴ EICV is a representative survey of Rwandan household conducted every three years by the National Institute of Statistics of Rwanda (NISR). In this survey, households are asked about a variety of socio-economic issues such as employment, living conditions, education.



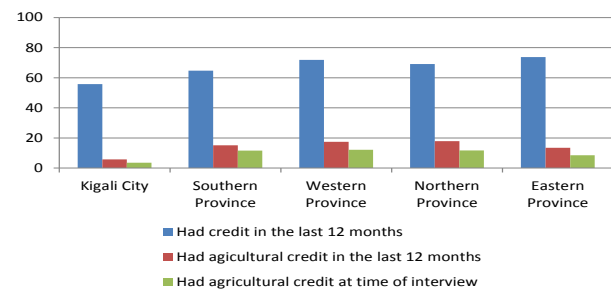
is used to get a deeper understanding of who is getting agriculture loans, their characteristics, the activities for which the loan is requested, lending financial institutions, the amount provided and the credit terms. Before proceeding to the descriptive analysis of the data from this survey, it is worth providing some definitions. First, *agriculture credit* is defined as credit whose purpose can directly be linked to an agricultural activity.⁵ However, not all households that apply for a credit request for agricultural credit. A *farm household* is defined as a household that is potentially interested in agricultural credit and as one with at least one household member doing agricultural work on some family owned, leased, or managed land.⁶

Furthermore, the analysis follows the findings of the National Institute of Statistics of Rwanda (NISR, 2015) that differentiates between four groups when analysing households' access to credit. These groups are as follows:

- i. Households that had credit outstanding when the interview was conducted;
- ii. Households that had credit outstanding in the previous 12 months. However, the households had paid back all its debt by the time the interview was conducted;
- iii. Households that do not have outstanding debt because they did not apply for credit;
- iv. Households that do not have outstanding debt because all their loan applications were rejected;

Given the definition of farm households, we classify about 87% of all Rwandan households as farming households. In only 13% of households, there is no individuals that is involved in farming for own account. With respect to the purpose of the credit, the majority of loans are not related to agriculture. Figure 1 presents the percentage of farming households that owed money or goods at any point in the 12 months prior to the interview. Farming households in Kigali City are considerably less likely to have borrowed in the last 12 months than those in other provinces.

Figure 2: Percentage of farm households with credit



Source: EICV4, author's calculations.

With reference to agricultural credit, the percentage of households with debt in the previous year is much lower than for total credit. The highest shares of borrowers are in the northern and in western provinces with 18% and 17 % respectively. The picture changes very slightly when looking at the percentage of farm households with outstanding agriculture credit at the time the interview was conducted. The subsequent analysis establishes whether participation in the credit market changes with regional or socio-economic characteristics.

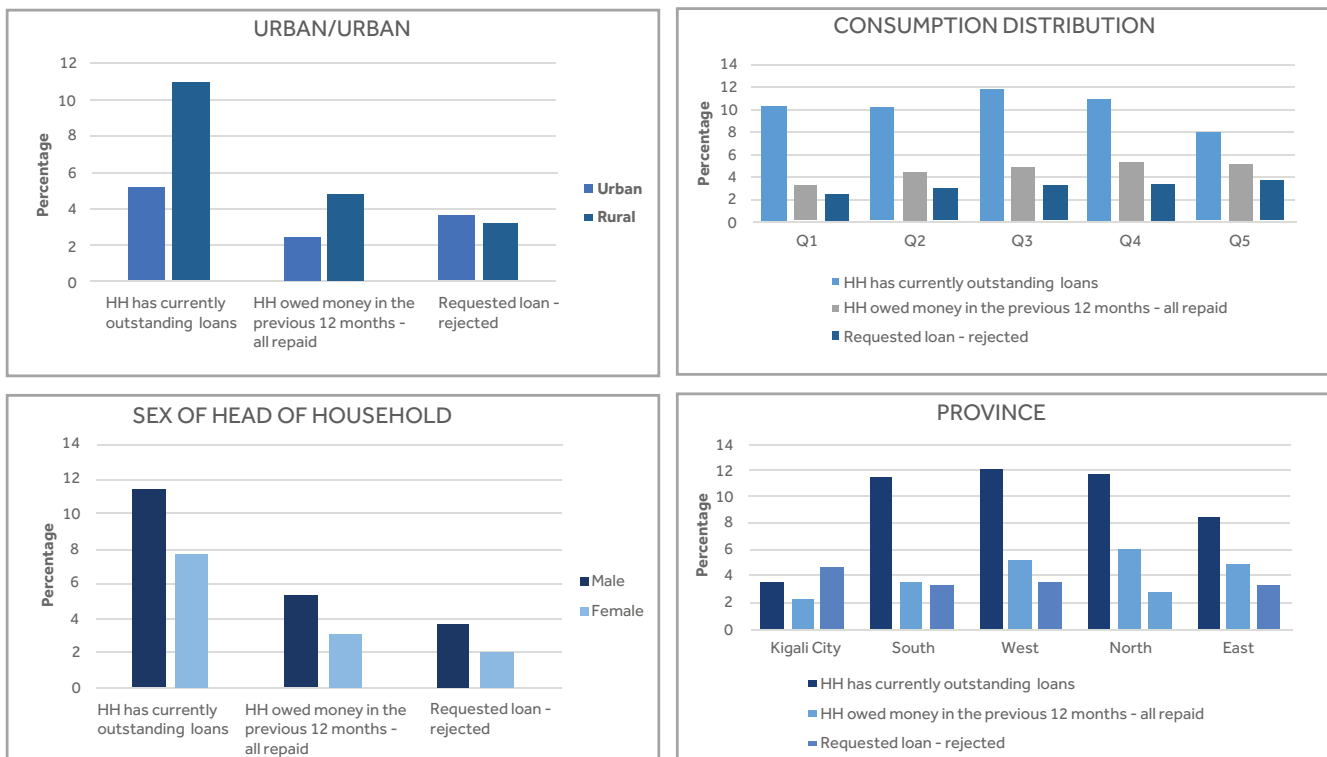
⁵ In EICV4, households are asked about the purpose of each granted loan. They can choose between 10 categories. We classify all loans as agriculture credit if they were either for 'agricultural equipment', 'agricultural inputs', or 'livestock purchase'.

⁶ More precisely, households are asked about their employment. We classify a household as farm household if any household member either works as 'independent farmer', as 'unpaid family farm worker', or is a 'member of farm cooperative'.

About half of farm households had outstanding debt at the time of the interview. The remaining 47% did not owe any money, either because they paid back all the debt (17%), they did not apply for a loan (30 %), or their loan application was rejected (1%). Again borrowing seems to be substantially more frequent in rural areas: about 36 % of farm households in urban areas did not apply for credit against 29% in rural areas. With respect to different quintiles in the distribution of consumption, wealthier households tend to borrow less. While

55% of farm households in the lowest quintile had outstanding debt, only 50% did in the upper two quintiles. At the top of the distribution, households are also less likely to apply for loans. Surprisingly, there is a high tendency for households at the top of the distribution not to access loans due to a rejection of their loan application. When the head of the household is a male, households are more likely to borrow than when the head of the household is a female. However, the loan applications by females are also more likely to get rejected.

Figure 3: Percentage of farm households with agriculture credit per characteristic



Source: EICV4, author's calculations.



Turning to farm households and agriculture credit only, the percentages of households that have borrowed are substantially low⁷. Agriculture credit is more common in rural areas than in urban ones. Accordingly, farm credit is also less common in Kigali City than in the surrounding more rural provinces (Figure 2).

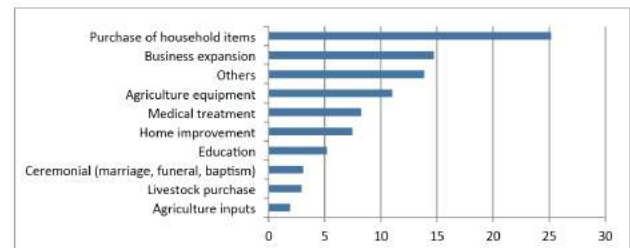
With respect to the quintiles of the consumption distribution, there seems to be a humped shaped pattern. The percentage of households with outstanding debt is higher at the mode than in the tails of the consumption distribution. In line with this, the percentage of households that did not apply for agriculture credit is the lowest for the third quintile (79%) and highest for the first and fifth quintiles (84% and 83% respectively).⁸ Similar to total agriculture credit, households with female heads are less likely to have borrowed, less likely to apply for and less likely to get an agriculture loan due the rejection of loan applications.

Let us now investigate the purpose and sources of finance for farming households in more detail. Figure 3 shows the loans received by farming households by purpose. Among agriculture loans, finance for agriculture equipment is by far the most important motivation for a loan application. About 11% of farming households have a loan to finance such investment. Only about 2% and 3% have loans to finance agriculture inputs and the purchase of livestock, respectively.

⁷ In total 10.5% of farm HHs had an outstanding agriculture credit, 4.7% owed money for agriculture purposes in the last 12 months and repaid it, 3.3% requested the loan but the request was refused and the biggest share did not request for an agriculture credit 81.5%.

⁸ The percentage of households that have not applied for agriculture credit is given by the sum of the 3 components, i.e: has currently outstanding loans, owned money in the last 12 months – all repaid and, requested loan – rejected.

Figure 4: Percentage of farm households with loans by purpose of loan



Source: EICV4, author's calculations.

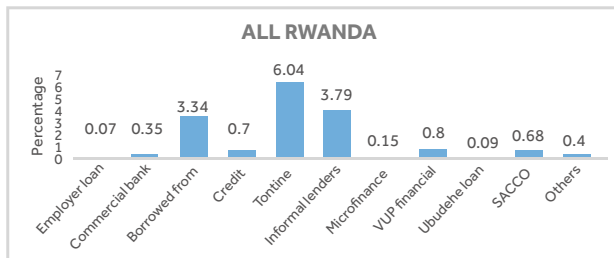
1.4.2 Credit source

In Rwanda the financial sector is composed of 504 institutions, including 17 banks (i.e. 11 commercial banks, 4 microfinance banks, 1 cooperative bank and 1 development bank), 16 insurance companies, 470 microfinance institutions (i.e. 19 limited liability companies and 451 Savings and Credit Cooperatives (SACCOs); of which 416 are Umurenge SACCOs); and one pension fund. The whole sector is very important as its total assets represent 53.7% of the total national Gross Domestic Product (GDP) (BNR, 2018).

In terms of outreach, MFIs, more specifically SACCOs, are the most accessible locally as they are available in every administrative sector in all the 30 districts in Rwanda. Moreover, they have been working with cooperatives; for instance, the farmers who are members of the IAKIB Dairy Cooperative in Gicumbi District, Northern Province, deliver milk to their collection centres and are paid through their accounts in SACCO. Nevertheless, commercial banks have also been trying to increase their outreach by introducing mobile banking services which provide micro services. The number of mobile banking users was almost 1.2 million (10% of the total population) in December 2017, while

the yearly volume of micro savers through mobile financial services was 963,848 for a yearly value of 4,535 million Rwandan Francs (BNR, 2018). This service also enables banks to lend small amount of money, smoothen the lending process and decrease transaction costs. For example, with the KCB Mobi-bank of Kenya Commercial Bank, a client can instantly access a loan between Rwf 500 and Rwf 500,000.

Figure 5: Percentage of farm households with agriculture credit by source of loan in Rwanda



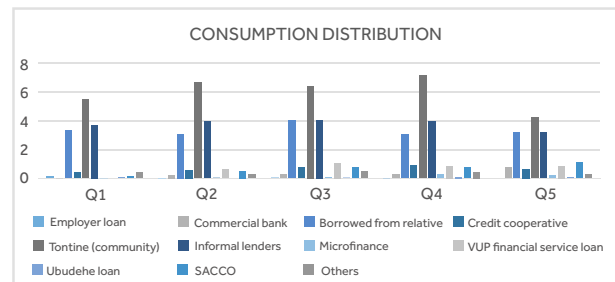
Source: EICV4, author's calculations.

Figure 4 presents the percentages of farm households with agriculture loans by granting institution. Tontines seem to be the most frequent source of agriculture credit. About 6% of farming households have borrowed from these for farming purposes. Informal lenders and relatives are respectively the second and third most common sources of agriculture credit. This is obvious given that most of farm households need small amounts of money mostly and have no collateral to present to banks.

Only 0.35% of households have an agriculture loan from a commercial bank. One interesting finding is that the percentage of households that typically borrow from the formal financial sector (i.e. commercial banks, MFIs and SACCOs,) is substantially higher in urban areas than in the rural

parts of the country and is more prevalent among economically well-off households. Only 0.05% and 0.15% of households in the lowest quintile of the consumption distribution respectively borrowed from a commercial bank or a SACCO. These shares monotonically increase to 0.79 % and 1.11% for the quintile with the highest consumption expenditures. Indeed, these high interest charging institutions are more present in urban areas; most banks are only present in the main cities of different districts around the country while the Development Bank of Rwanda (BRD) is only based in Kigali, and tend to lend to actors at the higher level of the value chain.

Figure 6: Percentage of farm households with agriculture loans by source of loan per consumption distribution



Source: EICV4, author's calculations.

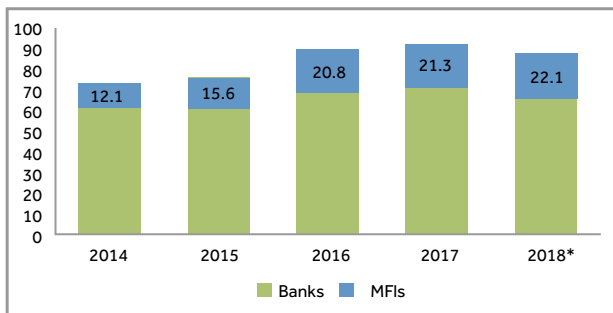
Although BRD's loan portfolio to the agriculture sector still represents more or less 5% of its total outstanding loans, however its contribution to the total agriculture loan portfolio of all financial institution⁹ remains the largest (41% in 2017) while the share of MFIs is growing every year (i.e. from 8% in 2012 to 20% in 2016). When we disaggregate to know the areas to which the loans are allocated, we find that most of the loans go to agribusiness, to the detriment of agricultural production.

⁹ The agriculture loan portfolio of all financial institution was increased from 57 Billion Rwf in 2012 to 92.2 Billion Rwf in 2017.



The latest data shows that Agribusiness (agri-processing and agri-trading) had Rwf 40 billion of outstanding loans while the agricultural production received Rwf 30.1 billion (World Bank, 2017). This could be a result of (1) the government's policy to promote agribusiness and (2) the fact that loans to agribusiness are relatively more performing than loans to agricultural production.

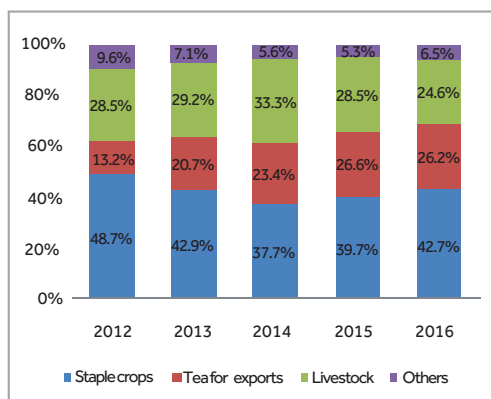
Figure 7: Trend of outstanding agriculture loans per financial institution (In Billion Rwf)



* Only the first quarter of 2018 Source: BNR and World Bank.

Most of the agricultural production lending is meant to finance staple crops and livestock, which respectively account for 43% and 25% of the total production lending in 2016.

Figure 8: Composition of bank loans to agricultural production

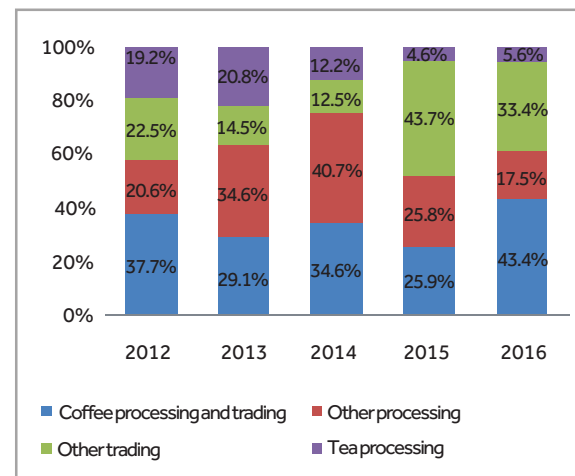


Source: BNR and the World Bank.

Note: The figures are an average of the quarterly data. "Staple crops" may include other crops. "Others" primarily include coffee production and fishing.

Tea production for export is also an important segment and has been increasing mainly because the tea sector is the most organized value chain and maintains a good loan performance in contrast to livestock loans which tend to perform poorly. Coffee is more financed as a business at the processing and trading level. At the production level, coffee farmers benefit from other forms of financing such as the fertilizer funding (See Innovation section). However, the non-performance of loans to the value chain of coffee is pretty high: at 15% of the total Non-Performing Loans (NPLs) in 2016. This is mainly linked to the fact that coffee prices are volatile and coffee producers have difficulties to secure purchase agreements. On the other side, loans for tea processing are being substituted by self-financing plans given that tea companies are mostly wealthier (NAEB and World Bank, 2017).

Figure 9: Composition of bank loans to agribusiness



Source: BNR and the World Bank.



1.5. References

AFR (2016), "Agriculture insights from FinScope Rwanda 2016 survey".

Berg, E. (2013), "Are poor people credit-constrained or myopic? Evidence from a South African panel", *Journal of Development Economics* 101: 195-205.

BNR (National Bank of Rwanda). March, 2018. "Monetary Policy and Financial Stability Statement."

Le Tourioner, J. (2011), 'Design of a grassroots inputs financing scheme in Rwanda: Draft report', MINAGRI, 27 May 2011

MINAGRI (2017), "Methodology and developing PSTA 4".

MINAGRI and DFID Rwanda (2011). "Rural and agricultural financial services strategy". *Oxford Policy Management Limited*.

NISR (2016), "Financial Inclusion in Rwanda 2016".

----- (2015), "Rwandan Integrated Household Living Conditions Survey – 2013/14, Main Indicators Report".

----- (2018), "Gross domestic product fourth quarter 2018".

World Bank (2017), "Rwanda Agriculture Finance Diagnostic Report". *Financial Inclusion Support Framework—Rwanda Country Support Program*.



SECTION 2:

Public Financing in Rwanda's Agriculture Sector



2014A Season Launch in Southern Province, Source: MINAGRI

2.1. Methodology and data needs

Before analysing the expenditure in the agriculture sector, there are different definitions of what counts as agricultural expenditure that are worth mentioning. For example, the Comprehensive Africa Agriculture Development Program (CAADP) takes a narrow definition of agriculture expenditure, which includes only funding allocated to the agricultural budget. The Food and Agriculture Organisation Monitoring and Analysing Food and Agricultural Policies (FAO MAFAP) definition is broader and includes expenditure that is not only directly related to agriculture but also expenditure that may stimulate agricultural productivity.

Using the CAADP definition to determine expenditure in the agriculture sector results in an under-estimation of the percentage of the

government budget allocated to agriculture. In fact, some other ministries and government institutions; other than the Ministry of Agriculture and its agencies; are responsible for expenditure designed to increase agricultural productivity as part of the agricultural value chain. Some examples include expenditure on feeder roads that improve access to markets, which is the responsibility of the Ministry of Infrastructure, and the school feeding programme, which is the responsibility of the Ministry of Education.

Furthermore, some program expenditures in agriculture are made by the districts and are included in the districts' budgets. There is no valid purpose in commercializing production and increasing productivity if farmers cannot get their



goods to market and /or there is no demand for the produce. Therefore, in order to exhaustively capture government expenditure, we used the broad FAO MAFAP classification.

We used two sources of data in order to disaggregate both planned and executed agriculture expenditures into: Identifiable Administrative Costs; Costs incurred on Agriculture Specific Policies; Costs incurred on Agriculture Supportive Policies; Expenditures in Support of Crops and Livestock Sector (Policy Transfers) and Total Expenditure in the Agricultural Sector. These are (i) the government budgets and (ii) the budget execution reports from the ministry of finance which enabled us to determine what was actually spent vis-a-vis the planned expenditure in the budget.

2.2. Public expenditure

The budget allocated to a sector reflects the country's commitment to achieve its targets for the sector. The CAADP expenditure sets a target of 10% of budget allocation and 6% annual productivity of the agriculture sector. Under the 2003 Maputo Declaration, member countries are committed to allocate at least 10% of the public expenditure to agricultural and rural development. Considering the national budget allocation during the last four financial years (from 2015/2016 to 2018/2019) and the MAFAP definition and budget execution reports, the proportion of the amount spent to agriculture varies between 9% and 10% of the total national budget. Overall, the Government of Rwanda has spent on average 9.17% of its budget on agriculture during this period.

Table 1: Agriculture sector share in national public expenditure in Rwf

Fiscal Year	Agriculture budget	Total National budget	% of the agric. budget in the total budget
2015/2016	173,027,952,313	1,808,812,969,876	9.57%
2016/2017	172,696,552,321	1,954,247,251,046	8.84%
2017/2018	206,576,269,921	2,115,391,665,081	9.77%
2018/2019	207,788,826,695	2,443,535,804,386	8.50%

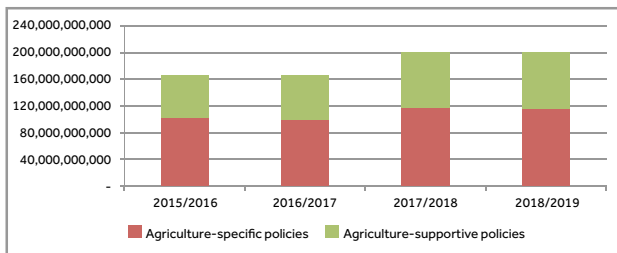
Own calculations using the MAFAP definition, Source: MINECOFIN: National budget

From the classification based on the MAFAP definition, the biggest share is allocated to agriculture specific policies compared to supportive policies. Input subsidies represented the biggest share in the three first years although it has decreased during the current financial year (2018/2019). This can be explained by the increased value chain financing with the fertilizer fund where tea and coffee value chain actors have managed to raise funding for fertilizer acquisition and managed to substitute funding from government subsidies.



This year (2018) the emphasis has been more specifically placed on financing sustainable diversified and climate smart crop production and productivity. Furthermore, national reserves development has been one of the priorities of the country so as to sustain national food security and nutrition programs. This is reflected in the increase of the storage and public stockholding item that reached 16% of the whole agriculture-specific policies expenditures.

Figure 10: Agriculture-specific policies and agriculture-supportive policies in total expenditures for food and agriculture, in Rwf, 2015/2016-2018/2019



Own calculations using the MAFAP definition, Source: MINECOFIN, national budget

In terms of agriculture supportive policies, rural health and rural infrastructure (i.e. road maintenance of districts) are key contributors to the agriculture budget. For instance, the maintenance of rural roads is an important contributor to the increase of the collected milk production because one of the challenges encountered by milk deliverers is

road infrastructure. In this sense the time used to deliver milk decreases with improved quality of road infrastructure and also the risks of accidentally spilling the collected milk on the floor.

In terms of agriculture budget execution, the emphasis is laid on ways to achieve PSTA3 and other agriculture programs: land consolidation, marshland irrigation, crop and livestock development, the Girinka program and national reserves construction. In terms of rural health and social protection, the focus is placed on fostering student nutrition and fighting malnutrition among the population; this is coupled with distributing small livestock (i.e. pigs and poultry) to vulnerable families for nutrition improvement purposes.

2.3. References

1. BNR (National Bank of Rwanda). March, 2018. "Monetary Policy and Financial Stability Statement."
2. Ghins, L., Ilicic-Komorowska, J., Mas Aparisi, A. (2013). "MAFAP Methodological Implementing Guides: Volume II. Analysis of public expenditure on food and agriculture". *MAFAP Technical Notes Series, FAO, Rome, Italy*.
3. MINECOFIN (Ministry of Finance and Economic Planning). Annual budgets



SECTION 3:

Field Experience



Source: BRD Annual report 2015: Basabira Laurent Rice Mill industries

3.1. Introduction

This section describes field experiences of BRD, BDF, UAP insurance and Urwego Bank. It presents some activities of these institutions in agriculture financing, the impact of their products, the challenges they face and the lessons learned from their work in Rwanda. The experience of BDF and BRD, as key instruments of government investments, is crucial to understand successes and challenges in achieving the government targets in financing agriculture. The experience of UAP insurance gives an insight of the applicability of insurance in the agricultural scenery. Lastly, the experience of Urwego Bank provides some challenges and lessons to learn from lending to smallholder farmers.

3.2. Development Bank of Rwanda (BRD financing agriculture)

The Development Bank of Rwanda (BRD) is the investment arm of the government of Rwanda, with a mission to be a trusted and strategic partner in the development of the country. This mission has to be achieved by availing financing and advisory services to dynamic entrepreneurs in key priority sectors. Created in 1967, the bank is dedicated to providing financing either as a loan capital or as equity to viable economic development projects, specifically those established under priority sectors in the EDPRS II, and its successor NST-1. To achieve this, the bank has to work with the government and other stakeholders to facilitate Rwanda's economic transformation with the general objective of creating jobs, reducing poverty and supporting the emergence of new businesses.



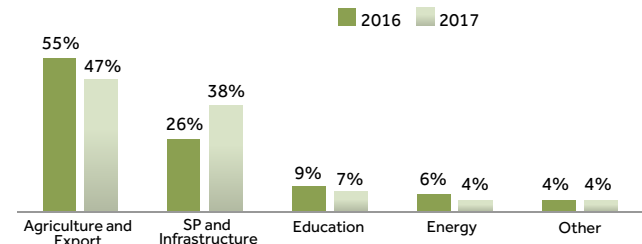
In 2015, BRD sold its commercial retail banking activities in a restructuring process with an aim to refocus on being a purely Development Finance Institution (DFI). Next to this, the bank took over the management of national student loan fund from the Rwanda Education Board (REB). It was against this background that it elaborated a five-year strategic plan (2016–2020) fully aligned to the government's priority sectors. These priority sectors include investments that are aimed at accelerating export development, catalysing agricultural financing, promoting affordable housing, managing and facilitating financing for education loans, and increasing investments in energy development.

3.2.1. Financing the agriculture sector

Agriculture is one of the five priority sectors of BRD and it is a key component under the Vision 2020 and the NST-1, and will certainly remain in the coming Vision 2050. For instance, one of the six pillars of Vision 2020 is to develop a "productive high-value and market-orientated" agriculture by 2020. (MINECOFIN, 2012)

In this context, BRD is committed to invest over USD 170 million during the 2016 – 2020 period. It was in this context that in 2017 BRD signed a Memorandum of Understanding (MoU) with the Private Sector Driven Agriculture Growth Project (PSDAG) of the United States Agency for International Development (USAID), to increase agricultural financing, hoping to increase financing and private investments in the agriculture sector. In this regard, the PSDAG will offer capacity building support to SMEs in difficulty to be active in the agriculture sector and do the monitoring and evaluation of BRD's development impact.

Figure 11: Concentration of gross loans among sectors of economy at BRD (2016 and 2017)



Source: BRD financial reports

BRD has focused its efforts on making its products not only accessible, but also affordable and has given an overall positive trend of growth to these efforts. The bank considers itself a key catalyst for the growth of the agricultural sector, partly because, unlike commercial banks, BRD also deals with start-ups rather than just existing businesses but also because agriculture remain the main lending sector of BRD (i.e. represented 47% of the total gross loans of BRD in 2017). Through the agriculture department, the bank has financed projects worth over Rwf7 billion during the financial year 2016. These projects are categorized into crop production, livestock, agro-industries, post-harvest infrastructure and agri-vet trade finance (BRD, 2016).

Of the Rwf7 billion, 14% went to livestock where the bank financed projects in poultry and cattle among others. These projects were expected to generate employment, increase production of animal and poultry products needed to fight malnutrition and boost income. 57% went to agro-industry and post-harvest infrastructure; the projects financed under this category include a modern abattoir to improve hygiene in meat handling and an electronic warehouse receipt system to streamline trading in agriculture produce. The rest went to refinance



microfinance institutions in order to increase access to finance by smallholder farmers whose efforts account for most of the country's farm produce.

Under the BRD's five-year Strategic Plan, the bank identified three key constraints faced by the agriculture sector and has designed three interventions aimed at unlocking agriculture financing and maximizing the agricultural sector potential. These interventions include:

(i) Supporting agro-processing industries to increase their value addition and agricultural production for domestic consumption and exports.

In order to address major constraints in agriculture, BRD targets the whole agriculture value chain (farmers' cooperative, distributors of inputs, agro-processors, etc.). For instance, BRD encourages contract farming and support modernization of the dairy sector to financing agro-processing plants. On the farmers' side, BRD aims to increase the quantity and quality of the production. It involves providing funds to value chain activities, specific linkages initiatives and value addition projects initiated by farmers coupled with technical training, capacity building and advisory services to farmers. On the agro-processing side, the bank uses more aggressive strategies to strengthen the sector, with the main aim to boost added value production which is planned to serve as an effective means to achieve economic transformation and sustainable livelihoods.

(ii) Providing risk management programs in order to unlock financing

Since financial institutions perceive the agriculture sector to be highly risky, BRD is developing strong

risk mitigation strategies to help the sector be more appealing to investments and other forms of support. The bank's intervention consists of providing loans to risk mitigation projects such as pesticides, fertilizers, insurance related costs, etc. This aims at minimizing and mitigating the risks associated with the crude financing of agriculture projects. For instance, the interventions focus on lifting the sector to achieve an annual growth rate of 8.5% fertilizer application (kg/ha/annum).



Rwinkwavu irrigation scheme. Source: Hope Magazine

(iii) Promoting mechanization to boost agricultural productivity.

The intervention involves allocating funds to irrigation projects, to both local and imported agriculture inputs, providing leasing of machinery and equipment, etc. In order to achieve the government target of 100,000 Ha of land irrigated in 2018, the bank lends to cooperatives and/or other investors carrying out irrigation projects. For instance, BRD supported cooperatives which do farming activities in a wetland in Rwinkwavu sector, Kayonza district with a tune of over Rwf 12 million, as a solution to the shortage of rain and hunger. Another feature of modernization is the partnership of the bank with local institutions such as the East Africa Exchange (EAX) in the post-harvesting stock as well as partnerships with farmers such as Milk collection centres and the KINAZI Cassava plant.



3.2.2. BRD's Agriculture financing channels



Outlook and Approach to agric Financing. Source: BRD (2017)

In terms of beneficiaries, BRD lends to the agriculture sector through 3 categories of customers: Individuals (i.e. crop growers or livestock farmers), Cooperatives and Companies (especially Agro-processing companies). The bank currently focuses on lending to cooperatives, which have the ease of being involved in different agriculture value chains all over the country.

With reference to providing financing, the bank can lend directly to the client (i.e. individual, cooperative, company) a minimum loan of Rwf 15 million. As per its definition, this loan excludes clients such as small and medium enterprises and smallholder farmers, who mostly need smaller amount of money even if they invest in economically viable projects.

Refinancing Micro-Finance Institutions

BRD introduced MFI refinancing mechanism, which is basically about indirectly disbursing finances through financial institutions and implementing agencies. This mechanism is rather ideal since the bank provides affordable and long-term lending which makes it easier for MFIs to manage micro-loans and reach more beneficiaries. Moreover, it enables the bank to increase the minimum loan amount to Rwf 50 million per client.

The rationale behind this is based on the fact that MFIs are major lenders to the agriculture sector. It is easier for MFIs to extend loans as low as Rwf 100,000 or less to farmers. In terms of impact, over the past seven years BRD has disbursed over Rwf 10 billion into refinancing and the mechanism aimed to contribute to the access to finance, to financial inclusion and to impact rural development and agriculture financing. In theory, the product has a multiplier effect in the sense that it increases access to credit by SMEs and smallholder farmers, which contribute to improved value addition of the agriculture production, thus enabling rural households to increase their income. In return, the government collects more tax revenues to spur employment opportunities and entrepreneurship for the youth and women.

3.2.3. Experience in the sector

The experience of BRD is rather crucial in understanding the financing of high level actors in the agriculture value chain as opposed to small-scale farmers.

a. Drivers of success

Monitoring: From the moment the bank issues loans, it ensures financed projects are sustainable. The bank does this by closely monitoring the implementation of the projects and where it finds it necessary, is willing to share the challenges with the customers to ensure sustainable implementation of the projects.

Capacity building: The bank also provides capacity building support to the beneficiaries of the projects that it finances. It does this by hiring external experts to jointly work with their qualified and competent staff to train farmers on agricultural modernisation.

This is done to help the clients who do not have the technical know-how and skills and cannot, therefore, implement their projects without assistance.

Box 1: Refinancing LETSHEGO Ltd

Letshego Rwanda Limited was established in Rwanda in 2004 as a subsidiary of Letshego Holdings Limited (LHL), a Pan-Africa financial services group headquartered in Gaborone, Botswana. It has been benefiting from BRD's refinancing scheme since 2011. Letshego Rwanda is renowned for supporting its customers by offering innovative and competitively priced loans between RWF100, 000 and RWF37.5 million. It mostly serves micro and small-scale entrepreneurs who borrow to fund their businesses in various activities including in agriculture, affordable houses and to meet their education and health needs.

In 2016, Letshego Rwanda had opened over 10,000 saving accounts with deposits standing at RWF1.3billion. Through issuance of savings, borrowing, payments and micro-insurance solutions, Letshego Rwanda aims to support the Rwandan Government's drive to eradicate poverty by fostering its customers' active participation in economic activities.

Pipeline of Agriculture sector projects (Letshego Rwanda Ltd) by the end of October 2016

Geographical coverage (province)	Number of clients	Consolidated loan amount (Rwf)
Kigali city	2	68,000,000
Eastern	13	170,000,000
Western	28	282,000,000
Northern	32	207,000,000
Southern	17	172,000,000
Total	95	899,000,000

By the end of October 2016, of the 262 credit applications made to Letshego Rwanda under different sectors, 92 were related to projects under the agriculture sector and were expected to benefit from affordable rates thanks to the BRD lending to Letshego at the interest rate of 12%. Geographical coverage shows that the biggest portfolio is spread across the other provinces of Rwanda other than Kigali City hence increasing BRD's outreach for rural development and improved livelihoods of small holder farmers.

Letshego Rwanda agriculture loans can go from a minimum of Rwf 500,000 to a maximum of Rwf 35 million for a term period that can vary between 1 and 36 months.

Editor's Note: From analysis of the 92 projects that have been funded by Letshego to a tune of Rwf 899 million, it is highly likely that these are large agricultural projects. More efforts need to be put into monitoring and evaluation of the BRD's refinancing program to ensure that small holder farmers actually benefit from this initiative.



Specific products: Given that every value chain has a specific production cycle and seasonality; the bank provides different terms and products accordingly.

Risk management: BRD works with guarantee funds such as BDF to regulate the loan interest rates depending on the economic situations so that the lending institutions do not levy too much burden of loan repayments on farmers.

b. Challenges

Riskiness of the sector

The nature of risks varies depending on the client and the value chain specificity, but some of the risks are common particularly to small farmers. The common risks include lack of attractive collaterals, lack of technical know-how, pasture and infrastructure, etc. Rural farmers are, for example, not keen on using the newer technology that attracts investors.

Another challenge is that farmers do not have enough capacity to raise their own contribution. As is the case for all lending policies for banks, a borrower needs to contribute a certain percentage to his project. BRD has tried to lower the contribution of the customer down to 30% of the project value so that the bank can finance the remaining 70%. This is useful mostly for start-ups as most of them do not have credible bank statements to present to financial institutions for loan application. However, even if the client's contribution has been lowered to 30%, many clients fail to raise it on their own.

Insurance

Another issue that BRD faces is finding adequate insurance, which is reportedly seen as a major issue in agricultural financing as most insurance companies in Rwanda are not comfortable with the

level of risk associated with agricultural financing. In order to circumvent this issue, BRD partners with insurance companies such as UAP and SONARWA, which are two of the major players in the insurance business.

Coordination and accountability

Given the collaborative nature of the work of the parties involved, coordination with so many parties involved can be an issue for BRD and can lead to difficulties in effectively holding each of them accountable their roles.

3.2.4. References

- Gasore, B. (2014), "BRD: Refinancing micro-finance institutions to increase access to finance for financial inclusion".
- BNR (2018), "Monetary policy and financial stability statement".
- BRD (2016), "M&E Team: Refinancing microfinance institutions to boost financial inclusion and access to credit to the Agriculture sector."
- BRD (2016), "Merger of BAS and BDF". *BRD's website*. Retrieved from: <https://www.brd.rw/brd/merger-of-bas-and-bdf/> accessed on the 25th June 2018.
- FAO (2017), "BRD agriculture financing and land scapping". *Report: Forest and Landscape Investment Forum (FLIF)*.
- HOPE Magazine (2016), "Focus on BRD financing interventions in the Agriculture sector."
- World Bank (2017). "Rwanda Agriculture Finance Diagnostic Report". *Financial Inclusion Support Framework—Rwanda Country Support Program*.



3.3. BDF: Guarantee financing agriculture SMEs



Source: BDF (2015)

In 2011, the Government of Rwanda, in partnership with the BRD, combined Advisory and Business Development Funding services to create the present Business Development Fund (BDF). The rationale behind creating BDF was mainly a strategy to implement the National Small and Medium Enterprises (SMEs) development policy that aims to support SMEs in accessing credit from financial institutions. BDF's main responsibility is to help SMEs to access credit by improving the availability of financing alternatives at reasonable costs. BDF's services include the following:

- a. **Credit Guarantee Funds.** BDF gives guarantees on loans for fixed assets or working capital. It combines all existing government consolidated funds for SME financial support that were spread across various ministries and agencies. These include the SME Guarantee Fund, the Agricultural Guarantee Fund, the Rural Investment Facility, the Women's Guarantee Fund and the Retrenched Civil Servants Guarantee Fund;



- b. **Managing matching grants** such as the Rural Investment Facility (RIF) grant, the PRICE grant, the post-harvest grant and the Rwanda Dairy Development program grant;
- c. **SACCO refinancing** aiming at increasing the lending capacity of SACCOs to specific individuals (i.e. women doing informal cross border trade) and to fund toolkits and equipment;
- d. **Quasi Equity** support to start-ups and agribusinesses;
- e. **Integrated Craft Production Centres (ICPC) equipment leasing facility** which is basically a leasing facilitation to ICPCs (Udukiri) allocated in every district. It provides training and conducive environments for technical start-ups;
- f. **Advisory services** such as capacity building, investment advisory and microfinance development and;
- g. **ICT services** at branch levels where they provide internet training, internet connection and public services such as Irembo and company registration services.

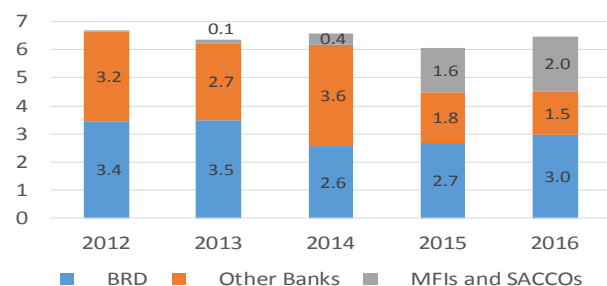
3.3.1. Facilitating Agriculture SMEs

BDF offers different financial services to agricultural SMEs, mainly through guarantee funds, post-harvest grants and quasi equity, which makes it easier for agricultural entrepreneurs to get collateral and expand their businesses.

3.3.2. Agriculture Guarantee Fund (AGF)

The AGF represents by far the largest share of guarantee funds provided by BDF. In 2016, BDF provided agriculture guarantee funds worth Rwf 6.5 billion representing 33% of the total lending to the agriculture sector. These guarantee funds are mostly funded through government programs, which explains the high contribution of BRD as the main user of the funds. Although it has decreased, the share of BRD was 46% of the total guarantee for the agriculture sector. In terms of risk sharing, the BDF offers guarantees in a range of 30% to 75% of collateral, depending on the category of applicants and the funding source. For instance, for companies and cooperatives, the maximum guarantee is 50%. For individual men above 30 years, the maximum guarantee is 50% of collaterals whereas for youth and women, people living with disabilities, retrenched civil servants, demobilized soldiers and genocide survivors, the maximum guarantee is 75%.

Figure 12: Channels of BDF agriculture guarantees issued (in billion Rwf) 10



Source: World Bank (2017)

10 Editor's note: Although guarantee funds channeled through MFIs have seen a slight increase over time the proportion of guarantees channeled through BRD and other banks have reduced over time. This implies that the proportion of guarantee funds has largely remained flat over time. Although demand side constraints have been raised, the Business Development Fund has to look internally in order to increase flexibility within which guarantee funds can be accessed better by agriculture value chain actors



The above graph indicates that the influence of banks into lending to agriculture is being substituted by MFIs and SACCOS through the years. The fund supported 1,375 projects in 2016 and the average value of the guarantee was of Rwf 3.5 million, which reflects the increasing relevance of the micro lending of MFIs and SACCOS. In fact, BRD's and other banks' average of agriculture guarantees were respectively of Rwf 74.5 million and Rwf 29 million.

3.3.3. Grants

In terms of grants given to agriculture projects, RIF grant and the PRICE grant represent the largest share of the total matching grants managed under BDF. In 2016, these grants respectively represented 62% and 12% of the total grant portfolio of BDF (6.8 Billion Rwf). BDF provides a maximum grant of USD 40,000 on capital investment (warehouse, machine, transport), depending on the size of the investment. For instance, the maximum grant is USD 2,000 for a capacity building project for private led business. As for cooperatives, the maximum grant for capacity building goes up to 80% of the total budget but BDF directly pays to the service provider.

Rural investment facility: This is a facility that was granted on behalf of the government's financing for agriculture where BDF covers 25% of the investment in an agricultural project along the whole value chain. However, this facility does not cover the working capital or operating costs (e.g. fertilizer input costs or wages) given that its main purpose is to provide incentives for both financial institutions and entrepreneurs to make productive investments in agriculture.

The Project for Rural Incomes through Exports (PRICE) grant: The grant, previously managed

under the Ministry of Agriculture, focuses on export crops, namely coffee, tea, silk, and horticultural crops, principally for local and regional markets by providing tailored and sustainable financial services to participating stakeholders. It finances the primary production and working capital by covering 50% of the loan.

Post-Harvest grants:



PASP beneficiary: Horticulture farm. Source: BDF 2016

- 1) The Post-Harvest and Agribusiness Support Project (PASP) grant:** The PAS-Project is set up and financed by MINAGRI and the International Fund for Agriculture Development (IFAD). It aims at addressing the challenges of post-harvest losses in order to increase rural income and create new investment and employment opportunities for vulnerable groups, including the landless poor. BDF comes in to manage and provide financial incentives for financial institutions and entrepreneurs to co-finance PASP-facilitated business plans. The PASP grant targets poor farmers and members of cooperatives who own small land plots, but the grants are awarded only to groups with business proposals that are strong enough to be awarded bank financing. It targets priority crops including potatoes, maize, beans, cassava and dairy products. These crops and dairy products are mainly found in 12 districts around the country; these are Nyagatare, Gatsibo, Kayanza, Kirehe and Ngoma in the Eastern Province, Kamonyi,



Muhanga, Ruhango and Nyanza in the Southern Province as well as Musanze in the Northern province and Nyabihu and Rubavu in the Western Province. The projects that are eligible for the PASP grant are transformation units, machinery for processing, transportation, climate resilient equipment (water tanks, solar systems), cycle systems, capacity building, and capital investment (drying ground, Sheller).

- 2) **Post-Harvest Climate Resilient Agri-Business (PHCRAB).** Eligible projects for the PHCRAB grant are Moisture meter, quality control, drying ground, collapsible dryers, palette, capacity building to name but a few.

Rwanda Diary Development Project: This grant is divided into three sub-categories as follows:

1. **The private led business grant:** To be eligible, the condition is to have a business plan as a private person and to include a cooperative as a supplier in the business so that it can benefit from the project. The private person gets a maximum grant of 30% whereas the cooperative gets 50%.
2. **The cooperative led business grant:** For this category, there has to be a Memorandum of Understanding (MOU) signed with the cooperative. In this category, big cooperatives are given a maximum grant of 50% whereas small cooperatives are given up to 80%.
3. **The joint ventures grant:** To be eligible, the condition is to be registered at the Rwanda Development Board (RDB) as a joint venture between a cooperative and an individual. The grant is given to the joint venture.

3.3.4. Quasi-Equity

The quasi-equity segment for the agriculture sector started in 2016 and targets the youth in agribusiness who are investing in the agricultural projects. The service is designed to encourage fresh graduates with an agricultural background to set up agribusiness projects. The program provides quasi-equity financing by availing a grant of 30% of the loan, 60% convertible shares of BDF, and the individual has to contribute at least 10%. The application process starts at the District level, where the district committee of stakeholders shortlists successful applications to be submitted to BDF. Then, BDF analyses the feasibility of the shortlisted projects and selects the ones to be funded. After the funding, the monitoring is done by the district committee of stakeholders, of which BDF staff are members. The beneficiaries are supposed to pay back in a maximum period of five years and can get a grace period of a maximum of 6 months. In this facility, BDF supports shareholders or investors in an agricultural company. The projects which get this type of financing include aquaculture projects, livestock and agriculture farming and horticulture and agro-processing projects. So far, BDF has provided quasi-equity to 25 companies and 70% of these are in agribusiness.

Eligibility criteria:

- It should be an agribusiness project owned by a Rwandan citizen;
- The owner of the project must be a secondary or a university graduate but who have spent at least 2 years after graduation;
- The project should demonstrate job creation potentiality (in a position to employ



a reasonable number of people especially university graduates);

- The beneficiary should be a cooperative or a company;
- The project should have a sense of innovation;
- The project should be a start-up with less than one year of existence.
- The project should fall under combined production into agro-business or agro-processing.

3.3.5. Financing Process

BDF does not directly interact with SMEs; it signs a Memorandum of Understanding (MoU) with financing institutions. Under the condition that if an individual/SME has not enough collateral to cover the loan, BDF can subsidize as much as half of the loan requested for by the borrower.

After providing the guarantee to the borrower, BDF, through its Advisory, Monitoring and Evaluation (M&E) departments, ensures a proper use of the service by visiting the business, having meetings with the beneficiary and monitoring its profit and working capacity on a regular basis. The advisory department advises on the procedure manually, providing the trainings and capacity building support while the M&E department is in charge of monitoring and visiting companies to ensure good performance; they can even restructure in case of low performance. However, it is different from the credit guarantee because beneficiaries are financial institutions' clients and BDF as a funder only gets

a quarterly report from the financial institutions. Thus, BDF can monitor the guarantee only after the quarterly report; then if the performance of the client is low there can be joint visits with the financial institution.

Different workshops and trainings are organized on a regular basis at the district level to sensitize people on BDF projects. In 2014, BDF opened branches in all the 30 districts of Rwanda that are coordinating the farmers at the grassroots level. In addition, there are advertisements on radio and television which BDF uses to spread messages to the public.

3.3.6. Experience

Overall, BDF funding is project based; thus the turn-up will change from one project to the other independently of the fact that the business plan presented to the financial institutions is viable or not. For instance, in the 2014 fund portfolio, the agriculture guarantee fund portfolio out of the Rwf 28,790 million granted as fund only 0.0091% was not performing while grants (PRICE and RIF grants) were performing much better.

In general, the sustainability of start-ups can be challenging. It is even more challenging in the agriculture sector with the weather uncertainty. In addition, when starting a business, entrepreneurs do not do enough market analysis before engaging in this sector even when they are asking for a loan. Equally, companies tend to start without adequate preparation of their business plan, with low managerial skills and limited working capital to



maintain productivity. Nevertheless, the projects of which business is already running and for which entrepreneurs need loans as additional financing tend to perform much better.

However, despite challenges, agriculture is a good investment and a good sector. It encounters several challenges mostly at the primary production stage but there are several opportunities at other stages. With the help from different stakeholders such as insurance companies, it is possible to share the risks that the banks fear in order to increase access to finance in the sector. This will encourage individuals to invest in the sector and decrease the reliance on banks for collateral in order to lend to the agriculture sector.

3.3.7. References

1. Business Development Fund (BDF). "Annual reports." Retrieved from www.bdf.rw/annual-reports on 19 November 2018.
2. MINAGRI (2013). "Agricultural Finance Facilities: Rural Investment Facility Phase 2". *The Republic of Rwanda*. Retrieved from: http://www.minagri.gov.rw/fileadmin/user_upload/documents/Agricultural_Finance_Facilities/RURAL_INVESTMENT_FACILITY_PHASE_2_RIFII-1.pdf
3. World Bank. (2017). "Rwanda Agriculture Finance Diagnostic Report." *Financial Inclusion Support Framework—Rwanda Country Support Program*.

3.4. URWEGO BANK: Financing Smallholder Farmers



Rwanda Rice Paddies. Source: Kiva



Urwego Bank is a Rwandan Microfinance Bank licensed by the National Bank of Rwanda. It was created in 1997 by World Relief Rwanda under the name “*Urwego Community*”; the bank focuses on serving small entrepreneurs under served by the formal banking sector. The services offered by Urwego Bank include deposit accounts, savings accounts, individual loans, home improvement loans and education assistance. The bank also offers insurance services, business training and HIV/AIDS related training. It is the largest Microfinance Bank in Rwanda and has branches and credit offices throughout the Country.

Currently Urwego Bank has three projects that facilitate a sustainable access to finance through loans: the group loan, the individual loan (SMEs) and the agriculture loan.

- **Group Loans:** This is basically a solidarity guarantee. The product was the first to be introduced by the bank when it started its operations in 1997. It targets a group of 10 to 15 people who are not necessarily investing in the same activity but everyone in the group acts as a guarantor of the rest of the group making sure that every group member will repay their share of the loan. This type of loan has a solidarity grant (social grant) incorporated so that a group of people who do not have the ability or enough collateral to secure the loan are subsidized from the grant. Depending on the agreements, the loan can be repaid on a monthly, weekly or quarterly basis. However, a single member cannot hold more than 35% of the total group loan. The solidarity loan/group loan offers a loan that can go up to Rwf 200 million.
- **Small and Medium Enterprises (SME) Loans/ individual loans:** The product was introduced

in 2000 as an extension of the group loan to facilitate individuals whose businesses were growing and wanted more financing to expand it. However, their business was not big enough to raise the interest of banks but then required more than the maximum amount allowed in the group loan. This also facilitated farmers that did not have solidarity groups to access loans immediately. SMEs or an individual can borrow up to Rwf 60 million mainly because the beneficiaries are considered to have the capacity to afford a loan from commercial banks.

3.4.1. Lending to the agriculture sector

The analysis of Urwego Bank's loan disbursement indicates that most of the bank's loans go to the agricultural sector. The driver's for the bank's interest into the sector include i) the fact that over 70% of the Rwandan population are employed in the agriculture sector, ii) the government's favourable agriculture policy which fosters agriculture as a business and iii) the smallholder farmers are the most financially underserved population in Rwanda. Urwego Bank's lending to the agriculture sector is designed around 3Ps (People, Products and Processes).

3.4.2. People

With people, the bank implies having specialized staff that understand the sector; thus among 15 agricultural finance specialists, 14 have to be agronomists by training. The main clients of the bank are: a) farmer cooperatives registered with Rwanda Cooperative Agency (RCA), b) farmer groups guaranteed by Cooperatives, c) agro-dealer cooperatives and individuals and d) individual farmers. The bank also partners with



the government (both central and local) and development partners.

3.4.3. Products

There are three types of products offered by the bank value chain financing (i.e. involve financing farmers of a specific value chain) to smallholder farmers through cooperatives; the cooperative acts as guarantor for its member and for farmer groups (Amatsinda y'ubuhinzi). In these products, the bank finances activities such as acquisition of fertilizers and seeds, pruning activities and post-harvest activities. These products target 4 crops: maize, rice, potatoes and coffee. The choice of these crops is based on three factors: i) the fact that they have the most organized structure of value chains. For instance, in the rice value chain, farmers work together in cooperatives and no one can take home rice for side selling and they have one supplier, which makes it easy to trace the money received; ii) supporting the government programs as these crops are under the CIP program iii) there is strong markets where farmers can sell these crops; and iv) the fact that these crops have regional outreach as each of them is more accessible in the 4 provinces of the country.

3.4.4. Process

Considering the smallholder farmer financing through cooperatives product as an example. Here the rationale is that through cooperatives, the bank can reach out to approximately 1,000 people at once. This is easier, quicker and more efficient in the sense that the cooperatives know better their members and can, therefore, monitor the loan. Here the agriculture loan is offered to a farmer who is an active member of the cooperative that fulfils the requirements of the Rwanda Cooperative

Agency. The registration is through cooperative leaders with complete identification, the Universal Parcel Identifier (UPI), the type of value chain a farmer wants to grow, the expected yield quantity and the amount of money they want to request for. Cooperative leaders then analyse the file to establish whether this specific individual will be able to repay the loan in due time according to their output. If it is not the case, cooperative leaders advise the member to request for a loan that is lower than what they intend to borrow so that they can repay it easily.

Figure 13: Urwego Agriculture Loan Process



Source: Urwego Bank (2015)

After the analysis, the cooperative gives accreditation to the list provided, and the leaders of the cooperative apply for the loan from Urwego Bank. In return, Urwego Bank's agriculture specialists visit respective farmers who applied for the loan to verify if the amount of money requested for is convenient and proportional to the expected yield and the estimated volume of the harvest a farmer provides will be obtained. However, it is not mandatory for every member of the cooperative to request for a loan. Only the ones in need will apply for it and this implies that they will be the ones affected by the reimbursement that will be taken from the money generated by the harvest, which



money they will deposit into the cooperative's account.

After the loan is granted, it is transferred to the cooperative's SACCO account and then distributed to farmers according to the amount requested for. However, the money is given to the cooperative for the benefit of the farmer. If the loan purpose is to purchase fertilizers, the bank works directly with the fertilizer suppliers and purchases the quantity request on behalf of the farmer.

In their respective cooperatives, farmers collectively collect the money from the production sold to the cooperative's clients or at the local market. The loan allocated to every member is then deducted from the earnings of the farmer by the cooperative depending on the methods of payment the farmer agreed on (daily, yearly or quarterly). The money is then collected by the cooperative and paid back to the bank as per the agreement, specifying the name of the farmer and the amount paid. In case the payment to the bank delays, the cooperative writes an explanatory note to the bank, giving reasons why the payment will delay and the bank extends the loan payment period.

3.4.5. Experience

Currently, Urwego Bank is providing credit to over 31,000 farmers, from 500 farmers who applied for individual loans in 2010, and 80 cooperatives in the agriculture loan department, from 2 cooperatives in 2010. The agriculture loan portfolio represents 20% of the whole portfolio and risk share represents only 0.2%.

From its experience, the bank has learned that agriculture business has to be considered as any other business and the risks in the sector can also

be found in other sectors. The bank advises that instead of running away from risks in the agriculture sector, it is rather better to find a way to mitigate them. This can be done by designing sector based products and allowing other forms of collateral such as contracts with off takers or the production at harvest to be used in securing credit for agricultural projects.

Lending to smallholder farmers is rather difficult for the moment unless it is done through a cooperative. This is mostly caused by the fact that smallholder farmers do not have enough capacity to secure collateral and they usually need smaller amount of money which is costly to financial institutions to follow-up for recovery. Lending through cooperative is therefore the most secure option to make it easier for financial institutions to recover their money since cooperatives can act as guarantors.

Another important factor in agriculture financing in the bank's perspective to limit the risk associated with lending to the farmers is the use of agriculture specialist staff members. They represent a valuable asset into lending to the sector. Loan applications are usually rejected not because they are risky but because the loan agent fails to defend it in front of the bank's board. Further, specialising staff who double as loan agents are better positioned to make follow-up and to understand the main reasons of the non-repayment of the loan. The team therefore has to make field visits so as to have a general understanding of the farmer's agribusiness operations and be accurate while presenting the situation to the bank's management before they can lend to the farmer. Through abiding by this process, the lender reduces misunderstandings and will give more hope that the lending conditions



will meet the farmer's situation.

Lastly, a strong collaboration with other stakeholders on the market is required so as to share the risks and facilitate the farmers to pay and adapt to the price fluctuation on the market and to the impact of climate change.

3.4.6. Challenges

- **Challenge for the bank:**

- ❖ **Insurance**

Agriculture insurance products are still costly; thus without subsidies from the government or other private institutions a farmer is unable to afford it. Therefore, in case prices fluctuate on the market or if the yield is lower than expected, the bank bears 100% of the risks and will be obliged to recover all the money by its own.

- **Challenges related to farmers and cooperatives:**

- ❖ **Poor management of the cooperatives due to low literacy in accounting and management.**

Some cooperative leaders and the farmers lack skills in loan and project management. Thus, once the loan is obtained, it is mismanaged, which poses threats to the sustainability plan of the agriculture financing scheme offered by Urwego Bank.

- ❖ **Lack of farmers' awareness on credit.**

Most of the farmers do not have enough awareness about the importance of credit to boost their farming activities. Having had low accessibility to finance from the agricultural sector in the past, some farmers still believe that getting loans is for businesses other than agriculture. In addition, the financial institutions also do not decentralize their

products to the farmers. This leads to a low number of farmers actually borrowing from financial institutions such as Urwego Bank to finance their agricultural projects.

- **Challenges from stakeholders**

- ❖ Government and private sector organisations involved in decision making about agricultural make decisions that affect the agriculture financial inclusion without consulting all affected members. Some of the decisions are related to importation of seeds and fertilizers processes whereby a specific type of fertilizers to be used is decided while there is not enough of it in stores. Thus, the farmers who applied for it will not be able to receive it in due time, which may lead to the loan being misused.

- ❖ **Price fluctuation:** This affects the agricultural loan whereby lenders give out the loan according to the price on the market, which is used to approximately estimate the amount of money that will be generated from the harvest. If the original price decreases, so will the money generated from the harvest, which make it difficult for the farmer to repay the loan.

3.4.7. Future outlook

As a way forward, Urwego Bank is planning to:

- Expand the activities of supporting small farmers through financing all the farming activities such as labour, fertilizers, seeds, pest control and post-harvest activities and value addition.
- Add tea to its value chain of crops that are financed through agriculture.



- Launch an education loan to facilitate access to finance for self-payment education and payment for children's school fees. This will help parents and other individuals to pursue their education on credit that will be paid in due time in accordance with the conditions set in the registration process.
- Cooperate with insurance companies and the Ministry of Agriculture to share the risks found in Agriculture through insurance. This will be

a method of de-risking the agribusiness as a whole and improve its eligibility to financial institutions. This will encourage farmers to apply for the loan to develop the agriculture sector.

3.4.8. References

Urwego Opportunity Bank. (2015). *"Agricultural finance"* Agripro focus presentation.

3.5. UAP INSURANCE: Insuring agriculture in Rwanda



Insurance may help mitigate the devastating effects of drought. Source: CIMMT.

UAP Insurance Rwanda is a subsidiary of UAP Old Mutual Holdings Ltd., a Pan-African financial services group. UAP started operating in Rwanda in 2011 and provides different services including insurance, investment management and property development. Currently, UAP has 12 businesses

operating in Kenya, Uganda, South Sudan, Rwanda, Democratic Republic of the Congo (DRC) and Tanzania.

The focus of the UAP's business includes general insurance, health insurance, life insurance and



savings. UAP Insurance offers a wide range of general insurance products that are tailor made to suit their clients' need. They include the accident and general losses cover, engineering solution, agriculture solution, property, etc.

The concept of insurance is defined as a transfer of financial risks from an individual to a pooled group of risks against a two party contract (World Finance, 2010). The policy taker (i.e. the person who subscribes for the insurance) want to be covered against an uncertain event by paying a small but certain amount so that in case of an incident he receives a pre-determined recovery, which is an increased cost of putting the structure back to its original condition.

3.5.1. UAP Agriculture Insurance Products

As part of its agriculture solutions, UAP provides a multi-peril crop insurance, which focuses on specific crops such as wheat, maize, barley, rice, tea, coffee, sugar, tobacco, horticultural crops, floriculture and tree crop. It also provides livestock insurance that covers dairy cattle, beef cattle, poultry, pigs, sheep and goats.

a. Crop Insurance



Source: UAP (2018)

Per its name, UAP's Multi-Peril Crop Insurance is a product whereby the insured can be protected from

multiple risks and uncertainties in crop farming. The product insures all commercial field crops with the idea to provide security for farmers in order to have enough production for the household consumption and for the local market. It covers farm assets and equipment such as harvested crops, greenhouses, and irrigation facilities. UAP compensates the money lost by the farmers, covering from the effects of climate changes and diseases, based on a pre-agreed market value of the insured crops at harvest. Generally, UAP's Agricultural insurance covers crops loss caused by hailstorm, fire, drought, excessive rainfall, frost damage, flooding and lightning. In short, the insured is repaid when he faces a bad season and/or poor harvest.

The premiums payment is based on the value of inputs or on the pre-agreed market value of the harvested crop. The premium rate for the multi-peril crop insurance ranges between 4.5% and 10.2%, depending on the crop type, the number of insured perils and on the risks that certain crops experience on ground such as deterioration. Depending on the option chosen by the farmer: for the *input cover*, the repayment is done any time, once a farmer gets a claim; for the *output cover*, the payment is done at the end of the season. When the loss necessitates replanting, the payments are done immediately. However, UAP does not cover crop losses due to work interruptions, delays in harvesting, confiscation of produce or farming equipment, theft, or other unaccountable losses. UAP also does not cover losses due to incorrect input application procedures (i.e. pesticide application, fertilizer application, etc.).

The subscription to this product is available through subscription from individual farmers or from financial institutions on behalf of farmers. The latter



approach, which is the most popular, is when a bank asks for the loan for the applicant to have insurance as an alternative form of security. The process of getting this crop insurance involves filling in a proposal form. UAP does a quotation and field inspection, specifies premium payment to be paid and lastly provides a contract. The benefits gained from using the multi-peril crop insurance include the fact that the insured farms have greater access to agriculture credit, farmers are covered against losses in the event of a bad crop season and crop insurance is a finance innovation that stimulates investments in the agriculture sector through increased access to funding and motivation of all stakeholders.

b. Livestock Insurance



Source: UAP (2018)

UAP offers Livestock insurance for dairy cattle, beef cattle, poultry, pigs, sheep, and goats. It compensates farmers through banks if they have used money from the bank for accidental deaths, fatal illnesses, emergency slaughters on advice of recognized veterinary surgeon, and livestock theft. Within the agriculture insurance, livestock insurance is a more popular product than crop insurance. This is because UAP is the insurer of

the Heifer project, the official cattle supplier of the GIRINKA program, and the government requires insurance coverage for cows distributed to the population in this program.

The main benefit for the farmers getting insurance of cattle is to get more investment in livestock project development, as it is easier for the farmers with insurance to get a loan from a bank. In return, once there is a livestock loss, both the farmer and the financial institution are compensated by the insurance company, which reduces the loss for both parties. However, the UAP livestock insurance covers 10% of the loss for all types of loss with the exception of the theft related loss for which it covers 20%. The application processes of the livestock insurance require a veterinary and valuation report of a registered veterinary surgeon, livestock identification by ear tags, tattoos or any other practical mode of identification for the livestock and filling in the application form as well as the payment of the premium.

The annual premium charges depend on livestock type and population to be insured. Normally, it ranges between 3% and 6% of the sum insured and the veterinary valuation serves as a basis for determining the sum insured. In the meantime, the claim of settlement requires a notification to UAP in immediate time for all other types of loss while for a theft related case, it requires a period of 6 weeks to searching for the stolen livestock before the recovery settlement.

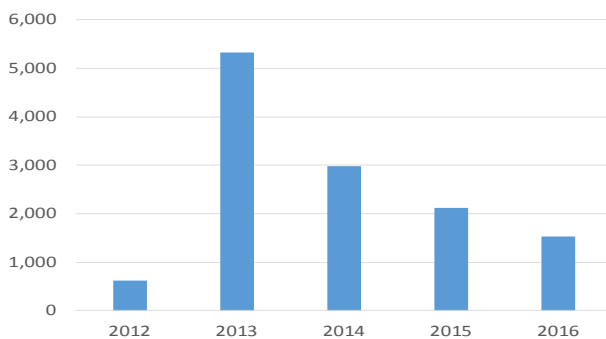
3.5.2. Experience

UAP Old Mutual entered the agriculture market in 2013 and UAP is currently working with 15 cooperatives and 5 groups made up of approximately 300,000 farmers to provide them with greater



financial security and access to agricultural financing options. In addition, UAP is collaborating with different other financial institutions like KCB Bank, RIM Microfinance, Urwego Opportunity Bank mainly on maize production. UAP believes that the agriculture insurance is not only to deliver security for the crops and livestock, but also help farmers look more credible, and professional. It also gives them collateral and all these benefits of agriculture insurance encourage more people to invest in agriculture.

Figure 14: Value of agricultural insurance policies (total sum insured in US\$1,000)



Source: World Bank (2017)

Despite some challenges, UAP remains the biggest insurance company involved in agricultural finance. UAP has increased access to financial lending for farmers by increasing trust and security between banks and smallholder farmers. All this has been possible through some key factors.

Network: UAP's operations are facilitated by its network of experts across East Africa, who provides technical assistance. UAP is sure that this support network will continue to be an asset as its operations grow.

Reinsurance: Considering the risk and cost of agriculture insurance, UAP also protects itself. The company is covered by a reinsurance company. UAP pays a premium charge and in return a reinsurance company shares the risk of UAP's operations, strengthening its capacity to reimburse farmers through banks.

Government support: The government has recently increased its engagement in the agriculture sector. More and more farmers are receiving support from the government through subsidies which help them afford insurance. The government is also encouraging more farmers to work in cooperatives, which benefits both UAP and the financing institutions they work with. When cooperatives receive a loan or insurance, they harvest their crop at the same time and have the same risks, which make it easier for UAP to monitor them. The government's involvement has substantially benefited UAP because farmers are more willing to listen to the government than they are to either banks or insurance companies. However, for greater success, improved collaboration between officials from the government, banks and insurance companies that work with farmers is needed.

Farmer engagement: The success of an insurance business is also somewhat cyclical in that, as more people buy into the Crop or Livestock Insurance programs, the more effective will UAP be in providing for all its clients.¹¹ As such, improved farmer engagement will be a major factor for the UAP's success in the future as a risk sharing and transfer mechanism.

¹¹ This is linked to the law of large numbers which states that for a series of independent and identically random variables, the variance of the average amount if there is a claim payment decreases as the number of claims increases.



3.5.3. Challenges

Currently, UAP reports not to make profit in its agriculture insurance programs, an issue which it attributes to several challenges, including the following:

Resistance by farmers: Agriculture insurance is expensive, and many farmers do not understand the importance of getting insurance. Moreover, insurance companies have a bad reputation for rural farmers; they fear that the companies will cheat them and steal their money. In the past, farmers have had issues with insurance companies which pulled out before reimbursing them.

Lack of awareness: Farmers often lack awareness about UAP and, given the cost of insurance, are unwilling to spend money on a product they are unsure about. Therefore, UAP spends a lot of time training and mobilizing farmers.

Costly technical knowledge: The ground works and assessments that UAP conducts require a lot of technical knowledge and mobilizing skilled staff can be costly.

The risk of the sector: There is also the general problem of working with banks in such a risky sector. For instance, in the 2015-2016 season, many farmers experienced a bad yield season and those who did not have insurance were unable to pay back their loans. As a result, banks have become more hesitant in their agricultural lending, which has led to an overall decrease in agricultural loans.

3.5.4. UAP's Future Outlook

Looking towards the future, UAP expects growth. Although it is currently reporting to operate at a loss, its position in Rwanda is secure and it hopes

to build trust, raise awareness, and increase profits. Some of this confidence comes from the fact that the government, through MINAGRI and Access to Finance (AFR), will continue to give out subsidies to farmers for livestock and crops. These subsidies will facilitate the financial lending process. UAP also hopes to expand their services to output covers in addition to their input covers (Crop-yield insurance-input covers protects the expected revenue due to unexpected yields, which is the volume of a crop's harvest. Crop-revenue insurance-output cover covers expected revenue from loss owing to market fluctuations of crop selling prices). Currently, they do not work with post-harvest handling because this service is still too expensive for many farmers and farmers have not yet expressed interest.

3.5.5. References

- FAO (2015). *Insurance of crops in developing countries*. Food and Agriculture Organisation (FAO).
- Rumiro, I. (2009). *Agricultural insurance*. The International Bank for Reconstruction and Development/The World Bank 818 H Street, NW: James E. Quigley
- OECD (2018). *Insurance markets in figures*. Retrieved from <http://www.oecd.org>, on 27 July 2018.
- World finance (2010), "Basic concepts of insurance". Retrieved from <https://www.worldfinance.com/home/risk-encyclopaedia/basic-concepts-of-insurance> on 27th July 2018



SECTION 4:

Innovations



This section provides experiences of innovations in agriculture finance in Rwanda. These innovations are diverse. Firstly, we present a model of vertical integration organisation and organic growth by Gicumbi Dairy Farmers Cooperatives (IAKIB), which has enabled farmers to attract financing. Secondly, we show case technological innovations through mobile phone apps that enables farmers access financing. These innovations are provided

by BK TecHouse and Kenya Commercial Bank. The former involves a digitalization of the input subsidy program where BK TecHouse provides a digital solution that helps smooth the issuance of input to farmers. The latter, which is also a digital solution in place by KCB, enables the bank to reach small holder farmers. Lastly, we showcase the innovative way of NAEB to fund fertilizer for the tea and coffee value chain.

4.1. GICUMBI DIARY COOPERATIVE: A case of Innovative organic growth



Mukangiruwonsaga catering one of her cow. Source: IPAR (2018)

Mukangiruwonsaga Agnès is a farmer and a former president of IAKIB, a cooperative of milk collection. She was a teacher when she received her first cow from HEIFER in 2002 in the GIRINKA program. For her, farming was just an occupation and a way to produce ghee and fertilizer for her land. She had limited knowledge on cow breeding and the first

time her cow produced milk, she did not even have something to collect the milk with and, as a result, she used an old bucket and collected approximately 12 litres. After realizing that her family could not consume all the milk she had collected, she and her neighbours who also received cows in the Girinka program had an idea to create an association that



would collect milk from other cattle keepers and deliver it to larger milk processors for a profit. Impuzamashyirahamwe y'Aborozi ba Kijyambere ba Byumba (IAKIB) cooperative was then created and started operating in 2003.

It started with 300 farmers and currently has around 4,000 members. IAKIB moved from delivering 300 litres per day in 2003 to 35,000 litres per day in 2018. IAKIB sells the collected milk to Inyange industries (25,000 litres), Blessed dairy industry (5,000 litres) and sells the remaining 5,000 litres to the informal market through its milk bar in the area. When IAKIB started in 2003, members used to pay Rwf 6,000 as social share and later on it was increased to Rwf 300,000. The management decided to reduce the social share to Rwf 50,000 in 2006 in order to encourage other people including the milk deliverers to register in the cooperative. This move resulted into a tremendous increase in members. IAKIB currently has 46 full time employees and 6 milk collection centres in Gicumbi; every milk collection centre has a veterinary pharmaceutical service and sells animal feeds and salt. In addition, the cooperative produces maize flour, "Akaryoshye", and provides a surplus of benefits which are shared by all members.

4.1.1. How it operates

The main organization structure of IAKIB includes a general assembly elected by the cooperative members; it is divided into two parts: the executive committee and the M&E committee which are supported by the technical committee (Manager and project managers). To facilitate its operations, IAKIB created zones according to geographical areas where members are located. It has 13 zones that correspond to the 13 sectors in Gicumbi district and each zone is divided into sub-zones

having approximately 20 members each. There can be 10 to 20 sub-zones in a zone that helps monitor the farmers in a more efficient and convenient way. These sub zones are led by 4 leaders who represent farmers in the general assembly.

To be a member of the cooperative you need to have at least one cow. To join, the farmer makes a written application to the leader of the sub zone and the application letter is then submitted to the leading committee for approval. Once approved, the farmer is requested to pay the capital share. When joining the cooperative, the new member is asked whether they themselves will be delivering the milk to the milk collection point or if they will need the services of milk collectors. Every farmer must also have an account in Umurenge SACCO through which their money is channelled after the milk has been sold. When the milk is sold, every sub zone leader takes a list of the names of the farmers that provided milk with the quantity they provided. This list is used to transfer their money to their SACCO accounts. A litre of milk is sold at Rwf 200 at the milk collection centre. Rwf 10 is deducted as savings and goes into the cooperative's account and the farmer gets the remaining Rwf 190 only if the milk was delivered by the farmer. If the farmer used a milk collector to deliver the milk, the farmer pays Rwf20/litre to the collector as transport fees.

4.1.2. Vertical Integration

Gicumbi dairy farmers have diversified their activities along the livestock value chain by engaging in the production of animal feeds, cattle breeds and salt, selling veterinary drugs and collectively selling milk to milk processors such as Inyange Industries and Blesses Dairy.

4.1.3. Quality assurance



Quality check and measuring the quantity of the milk at a milk collection centre
source: IPAR (2018)

In 2004, Anastasia resigned from her job as a teacher to fully invest in the farming business given that it generated money that is enough to cover her expenses. She currently owns 27 adult cows and 5 calves, 18 of which she gives to other people to breed¹². Overall she can deliver approximately 50 litres of milk per day depending on the season and the type of breed. During the rainy season, a Jersey breed may produce more than 30 litres per day, whereas in the dry season, a Jersey breed produces 25 litres per day. A While, Friesian breed season produces over 40 litres per day in a rainy while in dry season it can produce up to 35 litres per day.

4.1.4. Production fostering

The cooperative provides veterinary services at every collection centre such as selling veterinary medication to their members at cheaper prices or on credit and selling animal feeds. The cooperative also collaborates with the Rwanda Agricultural Board (RAB) and MINAGRI to provide veterinary trainings to the farmers on vaccinating their cows,

¹² In Kinyarwanda "Kuragirisha". It aims at sensitizing and enabling other people to livestock catering. Once the cow gives birth, the first calf is given to the person who gave you the cow as an acknowledgement and the second calf belongs to the cow breeder and all the milk production belongs to the cow breeder. It has a social and nutritional substance.

the quality and quantity of grass that they should feed the cows with and how to interact with the

cows during the breeding season. Anastasia says that it was during trainings and modern farm visits that she learned how to raise crossbreed cows.

With the money generated from livestock farming activities, Anastasia has been able to purchase additional plots of land to expand her farming activities and a car to transport grass to feed the cows. She also pays school fees for her children and has been able to direct water straight from the source to her farm, which resulted into continuous water supply. She uses cow dung to replenish the soil fertility of her plots and she maintains a good health as she cooks on biogas. This pensioner can generate a gross income of Rwf 120,000 per month. Like many other members of the cooperative, Anastasia appreciates the support from IAKIB, mainly its training services and the facilitation to access credit. Thanks to the cooperative she was able to turn livestock farming into a full-time job and primary source of income for her family with her retired husband.

4.1.5. Maintaining members' food security and welfare

In addition to the milk business, IAKIB also owns a small-scale maize flour processing factory. The processed maize flour is sold at the Cooperative's milk collection centres thus enabling the members to purchase it with cash or on credit. The cooperative also facilitates the members to access short-term emergency money through SACCOs to meet certain needs such as school fees for children or any other urgent issue. The borrowed money is deducted by the SACCOs when the cooperative remits the money from their milk sales via their



accounts in the SACCO. The cooperative provides milk containers at the milk collection centres on loan for the milk collectors who are unable to purchase them. Their money is then deducted on their monthly pay check until the loan is fully settled. Through the Heifer International program, when a cow dies, a farmer is compensated with another one and its first born is passed on to another household.

4.1.6. Financial inclusion

IAKIB has nurtured a positive relationship with the financial institutions, enabling it to access credit on friendly terms. In a discussion with the Managers of AIKIB, they acknowledged working with different banks such as Bank of Kigali, KCB, BPR and SACCOs. They have so far requested a loan of Rwf 37 million from BPR, which was transferred to Bank of Kigali. The loan was repaid in a period of 5 years. As the cooperative grows, it has been easier for it to access credit since it uses some of its assets as collateral. This has enabled it to purchase more land, build more milk collection centres, open a milk bar, a maize flour processing plant and reduce share capital from Rwf300,000 to Rwf50,000 per new member to gain more members. The cooperative also offers collateral to its members thus enabling them to access credit from financial institutions which is repaid from their earnings from milk sales.

BIZIMANA Donat, a cooperative member and a milk deliverer, was able to understand the concept of access to finance through meetings and trainings from SACCOs. He acquired a loan of Rwf3 million from a local SACCO and staked his plot of land as collateral and also received 40% guarantee from BDF. With this loan he purchased a motorcycle to ease the milk delivery process. He also bought a water tank on credit from SACCO and he

successfully repaid the loan.

As for Mrs. Mukangiruwonsanga, she used to request for a loan from the cooperative, but as her farming has grown she can request for a loan from SACCO. The fact that she gets her monthly salary through her account in SACCO facilitates the loan repayment. In this way, farmers can determine the amount of money to be deducted on their salary until the loan is fully settled. In case of interaction with a bigger financial institution, the collateral is issued by the cooperative. This collateral testifies that the farmer is a member of IAKIB and she/he delivers milk to the cooperative. With the good relationship between IAKIB and the financial institutions, the loan is given to the farmer with hope that they will pay the loan in full in due time.

4.1.7. Challenges

Rural infrastructure: The lack of paved roads and limited access to water were among the issues raised. Bumpy roads or pathways that were damaged due to adverse weather conditions pose serious problems for a timely delivery of milk. In addition, access to water in rural areas remains a problem; thus collection centres often experience water shortage and supply interruption.

Expensive equipment: In the agriculture sector, land husbandry is considered more lucrative and less risky in comparison to crop production. However, the cost of investing in the sector can be high. For instance, in order to start delivering milk for multiple cow breeders, middle-men have to purchase aluminium milk churns which cost Rwf 500,000 each. Similarly, the processing units of IAKIB require imported equipment with a 4- year warranty.



Milk contamination: This can happen if farmers add water to the milk to increase the quantity sold and/or when cows are breasted after receiving vaccination without the go ahead from the veterinary. If the contaminated milk is mixed with the rest, there will be a huge loss for the cooperative. For this matter, the cooperative works with local authorities to fine farmers who contaminate their milk by adding water.

Farmer payment method: The cooperative deposits the money for the delivered milk into the account at the end of the month. This means that the farmers are technically working on debt. This can be a challenge for those who prefer direct cash payments, which makes them more susceptible to side sell their milk.

Lack of market: There is only one big market (Inyange industries) which is a very big challenge for the cooperative and the farmers in general as it cannot consume all the produced milk.

4.1.8. Future outlook

Activity expansion

IAKIB is planning to further expand its activities by setting up a milk processing plant by 2020. The idea is to create a dairy factory in Gicumbi district with a containing capacity of 40,000 litres of milk.

This would reduce the transport cost and generate more revenue for the cooperative. This initiative was well received by cooperative members as it would increase the farm milk price from Rwf 200 to 220/litre and overall add to their dividends. Members have been contributing 1/10 on their milk production to participate in the creation of the processing plant. In addition, IAKIB wishes to expand its activities beyond Gicumbi District and expand production of animal feeds to 10 tons per day.

Livestock insurance

The cooperative also seeks to start sensitizing farmers to acquire insurance for their cattle and use them as collateral to raise credit from banks. The cooperative has been working with SORAS to provide livestock insurance to livestock farmers. However, many livestock farmers do not see the necessity to subscribe to livestock insurance or see it as too expensive.

Other priorities

The cooperative will also continue to recruit new members, to build additional milk collection centres and expand the maize flour factory and animal food. Another priority for IAKIB is to recruit young people and spark their interest in agriculture for the sake of the cooperative's sustainability.



4.2. Digital Solutions to increase financial inclusion



Source: "How digital is solving three problems in agriculture," Technoserve

4.2.1. BK TECHHOUSE: Digitizing the input subsidy program

Rwanda is a landlocked country; thus the importation of products such as fertilisers and improved seeds can be costly due to high taxes and high transportation fees, making them too expensive on the local market. Therefore, the Government, through MINAGRI and affiliated institutions, initiated the "Nkunganire system" whereby a farmer who grows one of the crops target by the Crop Intensification Program (CIP) gets a subsidy on fertilizer purchase. The CIP focuses on specific crops suitable for the Rwandan soil such as maize, wheat, rice, potatoes, beans and cassava. It also issues chemical fertilisers to improve the soil fertility while encouraging the use of organic fertilisers mixed with inorganic fertilisers.

The fertilisers distributed include macronutrients, micronutrients fertilisers and compounds/blends fertilisers (MINAGRI, 2018).

The Government sets a ceiling price of seeds and fertilisers which agro-dealers and fertilizer distributors cannot exceed. The farmer pays a predetermined fee and the remaining fee is paid by the Government through the Nkunganire subsidy System. For each agriculture season, MINAGRI, through affiliated institutions such as RAB, launches a public tender for competent and qualified companies /individuals that can supply both seeds and fertilisers needed in the Nkunganire program.

Table 2: Statistics for all provinces in the 19A season

	Fertilizer	Seeds
Land Size	491,349.14 Ha	279,417.12 Ha
Expected Farmer's price	22.49 Billion Rwf	2.09 Billion Rwf
Expected Government subsidy	8.25 Billion Rwf	8.49 Billion Rwf
Total Expected price	30.74 Billion Rwf	10.58 Billion Rwf

Source: SNS (RAB 2018)

The subsidies of improved seeds vary depending on the crop types. Hybrids of maize grown in highlands are subsidised for 75% to 85% of the total price, while the subsidy of maize hybrids of lowlands and marshland is 85% of the total price. On the other hand, the Open Pollinated Varieties hybrid gets a subsidy of 61% from the government whereas Soya beans which are imported from outside of the country are subsidized at 88% by the Government. Soya beans multiplied inside the country are subsidised at 67% and the farmer pays 33% of the total price. In addition, a wheat variety imported from outside of the country gets a subsidy of 75% and the farmer pays 25% of the total price. Wheat produced inside the country gets a 62% Nkunganire subsidy from the Government (MINAGRI, 2017).

Distribution process of seeds and Fertilisers

Companies which supply fertilisers and seeds import the quantity and quality, following requests from farmers at the village level. The fertilisers and seeds are imported through the Agro-Processing Trust Corporation Ltd (APTC), which distributes the fertilisers and seeds to agro-dealers in their respective locations.

1. Placing the order

Initially, farmers are grouped into TWIGIRE MUHINZI groups, composed of 15 to 20 farmers growing similar crops at the village level. Every group puts together a list with farmer's identification details: ID number, land size, type and varieties of fertilisers/ seeds needed. They submit the list to the local leaders at the cell level, who then forward it to agro-dealers/ fertiliser retailers at the local level. The list submitted to the Agro dealers serves as a basis to determine the quantity and types of fertilizer/seeds to be covered by the Nkunganire subsidy program. Then agro dealers in different parts of the country place their orders to the distributor, who forwards it to supplying companies.

2. Channelling the order

Once they know the quantity needed on the market, suppliers import fertilizers and seeds and channel them to APTC. Agro-dealers purchase fertilisers/seeds from APTC; a delivery note has to be signed once the agro dealer receives fertiliser/ seeds and approved by sector and cell executive secretaries to ensure that the quantity delivered to Agro-dealers matches the quantity requested by



farmers. A follow-up of the order has to be made by the sector executive secretary in partnership with sector agronomist, the cell executive secretary and Integrated Development Programme (IDPs) in cells. They are required to visit the agro-dealers' shops within 48 hours following the reception of the fertilizers/seeds to ensure that they are stored according to standard norms.

3. Payment for the order

Once a farmer receives the quantity requested for, he/she must sign a confirmation that he/she has received fertiliser/seeds with Nkunganire subsidies. The payment can be done with direct cash or through the account of an Agro Dealers after deducting the Government subsidies. Agro-dealers then take delivery notes to RAB for the payment of the remaining fee, which is subsidized. Consequently, as the whole process is manual and involves various stakeholders, it faces some challenges as follows:

Information gap between different stakeholders:

There is a challenge related to information transmitted from farmers to RAB; there is no direct channel through which farmers can share data easily. It has to go through different stakeholders, which leaves room for error and data manipulation. This makes the process longer and renders the information unreliable.

Timing to receive fertilizers: Red tape tends to slow down the whole process of receiving fertilisers/seeds by the farmers. As a result, there are some delays and some farmers receive fertilizers after the planting season.

Difficult access to loans in order to purchase inputs:

Loans from financial institutions are granted based on the ability to reimburse. However, the

agriculture sector in Rwanda is regarded as a risky and unpredictable sector. Furthermore, farmers are not the ideal candidates for loans as most of them do not have collateral and/or insurance. As a result, they cannot afford to purchase the quantity of inputs that is necessary for their land.

Other challenges are related to the manual nature of the Nkunganire system. Some of these are:

- Payment modality of subsidies;
- Recognizing the farmers' profiles;

Distribution of fertilizers/seeds

The real quantity of fertilizers/seeds that is allocated is insufficient at the farm level, due to lack of connection between supply and demand.

It was against this background that RAB entered into collaboration with BK Techouse in order to improve, through the Smart Nkunganire system, the Rwandan Agriculture sector by increasing financial inclusion, purchasing power, yield prediction and linkage between farmers and buyers.

4.2.1.1. The smart nkunganire system (SNS)



Source: BK Techouse website

a. BK Techouse

BK Techouse is a subsidiary of Bank of Kigali Group along with BK Bank, BK insurance and BK Securities. It was created with a mandate to provide digitized

solutions that respond to clients' needs. It focuses on developing technology and creating friendly financial solutions and high quality innovative technology products and services that empower customers to thrive in a fast changing market. In 2016, BK TechHouse expanded its mandate and is now providing services in 3 key areas: (i) connectivity and internet of things (IoT), (ii) a digital division and (iii) a consulting division.

As part of the consulting division, BK Techouse, in collaboration with RAB, has built the Smart Nkunganire system (SNS). This is basically a supply chain management system which aims to digitalize the value chain of the Agro-Input Subsidy program and ease financial access for farmers. This digital platform will be accessible to farmers and other stakeholders via a mobile app.

With SNS, BK Techouse aims to contribute to the agriculture sector in three ways:

- Creating digital consumers by facilitating access to advisory message with instant reconciliation and instant SMS notifications to all parties involved;
- Solving problems of farmers related to the manual nature of the Nkunganire system; and
- Increasing financial inclusion: through this system, the main goal is to increase the agriculture credit portfolio to 30 % by creating a fast and reliable data-based system for financial institutions and insurance companies to access farmer's profile information. This will contribute to creating a new market niche outside the corporate targeted clientele.

b. How it works

The SNS comprises three phases, which enable the farmers to get their fertilizers/seeds on the right time and at the right place. It also facilitates payment modalities, raises awareness of the agricultural finance sector and links the farmers with agro-dealers and financial institutions. Those phases include a farmer registration phase, a store and ordering phase, a digital payment phase.

Phase 1: Farmer's registration

The first phase has already been completed under a pilot project that started in March this year.

The system is web and USSD based and is integrated with National Identification system (NID) and the land registration system (UPI). The UPI land profile contains information on the land size, location, types of crops cultivated and ownership (if the land is owned by the farmer or if it is rented). From the cultivable land information, the system generates data on the quantity of inputs needed and the cost by Kilograms. This information is available from the national to the village (Umudugudu) levels.

Figure 15: Captured information about farmers



Source: RAB (2018)

Then farmers can receive an electronic chip (agafunguzo) that is linked to the system from agro-dealers at a charge of Frw500, and can present it whenever they are buying fertilizers and seeds.



This chip holds information on the farmer's profile such as their identification number, the type of seed they are receiving, the amount of money they are paying and the amount that the government is contributing as subsidy. If the farmer has requested for a loan to buy fertilizers/seeds, the amount of money approved by the bank is transferred to the chip and can only be used to purchase the specified seeds and fertilizers from the agro dealer's shop. However, if the transferred money is not used during a specified period of time, it is sent back to the financial institutions that provided the loan.

Every farmer is eligible to enter in the SNS program regardless of the types of value chain they are part. The farmers are identified through the RAB's internal database. After farmers have self-registered, their profile goes through a validation process which is conducted by the sector agronomist to testify that the information provided is accurate. RAB employs 20,000 trainers to assist farmers and sector agronomists in using the system.

Phase 2: Stock management and order processing

The stock ordering phase, which is still under process, aims at improving stock management, order processing and linking agro-dealers to the farmer. It implies the registration into SNS of all stakeholders involved in the supply of inputs. The supply chain starts with RAB calling for bids from suppliers and then successful suppliers import seed and fertilizers. Thereafter, distributors purchase these inputs and sell them to agro dealers who then sell inputs to farmers who will pay their contribution.

This phase smoothenes the ordering process in the following way:

- *Farmers and agro-dealers*

Through their TWIGIRE MUHINZI groups, farmers can go to agro-dealers and use their 'agafunguzo' and place an order when they need fertilizers and/or seed at the beginning of the season. Agro-dealers then register the order using the Ordering Process Device (OPD). The OPD reads information on the 'agafunguzo' and captures the quantity of inputs required by the farmer. Once the order is ready, farmers receive a message on their mobile phones. At the pickup, the OPD computes the transaction according to the amount of seeds and fertilizers that the farmer is purchasing, how much it is going to cost the farmer and how much is the government's contribution.

- *Agro-dealers and distributors*

The OPD is registered under the agri-dealers' name. Once she/he has all orders registered, he places orders to distributors. The latter have access to the system from their computers and /or smart phones. Distributors can then distribute the exact amount of input ordered for, which facilitates their warehouse management.

- *RAB and distributors*

When distributors have approved the agro-dealers' order, they notify RAB on the quantity needed. This enables RAB to know how much they will pay under the subsidy program and to have accurate data on the quantity of fertilizers used by season.



Phase 3: Digital Payment

This phase will be important to reinforce the outcome of SNS. The aim of the digital payments is to have cashless transactions and to improve financial inclusion. Farmers pay to agro dealers using the “Agafunguzo” tool, their transaction number is recorded through the system which generates the share paid by the farmer and the remaining part to be subsidized by the government. The payment method can either be through Mobile Money Tigo cash, Airtel Money Banks or direct cash payment. Agro dealers have to indicate their registration number but also their order number to suppliers in order to facilitate the transaction.

This phase will involve different stakeholders: financial institutions, Mobile Network Operators (MNOs) financial services, and other stakeholders in agriculture (farmers, agronomists, agro-dealers, etc). These financial institutions and MNOs will also have to register in the SNS. The product will benefit farmers, financial institutions and MNOs:

Farmers: It will enable them to have access to financial services. From their mobile phone they will be able to request for loans from different financial institutions registered into SNS and to pay using MNOs services.

The product will enable them not only to have a larger market for their services but also to know who they are dealing with. In fact, given that the whole system requires agronomists and local authorities to corroborate the information about farmers, giving a more accurate and reliable farmer profile, the financial institutions and MNOs will be more comfortable lending to the sector.

c. Impact of the Smart Nkunganire System

So far, BK TecHouse has positive feedback from farmers and already 900,000 farmers have self-registered into the SNS. On the 11th July 2018, the system had registered 1,133,421 unique farmers among which 1,062,239 were approved and 71,182 were still waiting for the approval of sectors’ agronomists. This number includes farmers growing tea and coffee who receive government subsidies from NAEB. After mutual consultation with RAB and BK Techouse, NAEB supported the necessity to include them under the scope of SNS.

Farmer’s benefits

Registration: “The digitalized system will reduce the back and forth movements and uncertainty of farmers who will now be able to keep track of their registration process and be sure that they will receive their fertilizers as approved by RAB” (An Agronomist in Nyamasheke District, Western Province).

Order tracking: “Before the SNS, there would be cases where farmers would request for 50kgs of fertilizers but when they got to the agro dealer’s shop they could find that the order under their name is 20kgs only. But with this system the farmer will be able to track the approval of their request by RAB and accurate amount of the fertilizer will be provided” (Agronomist in Nyamasheke District, Western Province).

Financial Benefits

The financial phase of SNS is yet to be implemented but it is expected to have the following impact at the completion of the program:



Most of financial institutions and insurance institutions see Agriculture as a risky sector, which hinders farmers' access to loans. One of the reasons for this fear is that these institutions do not have enough information on farmers. Therefore, the SNS's primary solution will be to de-risk agriculture in order to increase financial inclusion in the sector, by reducing the information gap between the farmer and financial institutions.

As a result, the system will ensure an efficient and timely sharing of information between different stakeholders, which will decrease the information gap on the input supply level. Thus, this platform will improve financial inclusion in the sector in the sense that, through farmer profiling, financial institutions will be able to design special products suited for the agriculture sector.

SNS ensures that there is no money diverted provided that, with the "agafunguzo" process, farmers can only buy inputs at specified agro-dealers' shops which insures that the loan is used for its intended purpose.

In addition, this system will enable other features such as the Agriculture yield prediction because of the data on the farm size, seeds/fertilizers used, and who is practicing agriculture where. This option will generate an estimation of the total harvest by farmer. This estimation can then be considered as collateral by the bank and/or can be used to secure an insurance. This will reassure the financial institutions to give money to the farmers.

d. Challenges

Brand name: Even though, BK TechHouse is a subsidiary group under BK group, BK TechHouse and the Bank of Kigali are two different entities.

The name can be a setback for other financial institutions; these institutions tend to view BK TechHouse as a competitor rather than a potential collaborator that deserves to enter in commercial partnerships with these institutions.

Low literacy rate: With a low level of IT literacy and literacy in general in rural areas, it can be a constraint to sensitize farmers to enrol in the SNS and show them how the system works.

Lack of internet coverage: Some agro-dealers and their shops are located in areas without internet connection. This can be a serious constraint, particularly in the last phase (digital payment) as agro-dealers need to have access to internet in order to make payments and other transactions with farmers and suppliers.

4.2.1.2. Development and sustainability

As the system is expected to be fully operational this year, with a target of having two million farmers enrolled in the Nkunganire program registered, it still has much to accomplish and more solutions to provide.

In other market segments, based on the mission of the platform which is to provide digital solutions to Rwandan farmers, BK TechHouse expects to include the Girinka and the irrigation and mechanization programs in the system.

On the technical side, SNS is an evolving and living product that is ready to take new direction and program requirements. However, BK TechHouse has been investing capital in building the system. Down the road, it wants the government to come up with a sustainability plan for this system with government subsidies or financial and resource support.

4.2.1.3. References

- AFR (2016). *Digital financing in Rwanda, leveraging technology for maximum use of financial services.*: Impact assessment note, on FinScope, 2016, Rwanda.
- MINAGRI (2017). *Amabwiriza ya Minisitiri w'Ubuhanzi n'Ubworozi no0003/2017, yo kuwa 01/2017, yerekeye itagwa ry'inyongera musaruro z'Ubuhanzi (Ifumbire mvaruganda n'imbuto zindobanure) harimo Nkunganire ya Leta mu bihembwe by'ihinga bya 2018 A & B.* Retrieved from www.yeanrwanda.org, on 20th June 2018.
- MINAGRI (2018). *Crop intensification program. Ministry of Agriculture and Animal resources development* Retrieved from <http://www.minagri.gov.rw/index.php?id=618>, on 27th June 2018.
- MINAGRI (2016). *National ICT4Ag Strategy 2016-2020.* Retrieved from www.minagri.gov.rw, on the 02nd August 2018].
- RAB (2016). *Training on Smart Nkunganire System (SNS) registration.* Retrieved from <http://rab.gov.rw>, on 26th June 2018].
- BK Techouse. (2018). *Smart Nkunganire System.* BK Techouse, Retrieved from <https://www.smartnkunganire.rw/>, on 03rd July /2018.
- The New Times (2014). *ICTs transforming agriculture-report.* Retrieved from <https://www.newtimes.co.rw>, on 10th November 2018.



4.2.2. KCB: A Digitized extra mile to reach smallholder farmers



KCB MobiGrow training sessions. Source: KCB (2018)

Kenya Commercial Bank (KCB) was established in 1896 along the east African coastline in Zanzibar (Tanzania) as a branch of the National Bank of India. In 1970, the government of Kenya obtained the majority of its share and changed the bank's name to Kenya Commercial Bank. Since then, KCB group has managed to become the Eastern Africa's largest and oldest commercial bank on asset base (USD 6.28 Billion) with 7 units across the region in Kenya, Tanzania, Rwanda, Ethiopia, Burundi, South Sudan and Uganda and over 236 branches, 15,082 agents and 962 ATMs. It currently accounts to about 15.7 million customers. It is listed on 4 stock exchanges in the region namely Nairobi Securities Exchange (NSE), Dar Es Salaam Stock Exchange (DSE), Uganda Securities Exchange (USE), and

Rwanda Stock Exchange (RSE) (KCB, 2018).

In Rwanda the bank started its operations in 2008 and now has 14 branches in the main towns and cities in the country. The bank aims to stimulate efficiency while increasing its market share in order to become the preferred financial service provider on the continent with global reach. The bank's clients comprise corporates, SMEs, Micro customers and individual clients. It provides them with different services such as corporate services, SMEs and micro services, agribusiness finance, mortgage finance, personal banking, branchless banking (alternative channels and innovation), institutional banking, and custody services.



The interest of KCB in the agriculture sector is based on the fact that the sector accounts for a large percentage of population in Rwanda, there is a structured private ownership of land by farmers and the fact that 79% of the total land in Rwanda is allocated to agriculture. In addition, it is also based on the fact that Rwanda has two seasons (A&B) per year for food crops and season C for irrigated land pledges for a good productive sector. The lending of KCB to agriculture is articulated around specific themes:

- **At the corporate level**, it implies supporting infant food production and processing in order to provide animal proteins and fortified foods in partnership with the International Financial Corporation (IFC) and the Clinton Health Access Initiative (CHAI) supporting nutrition and innovation in food ingredients. It also implies fighting malnutrition.
- **At the SME and Micro levels**: KCB supports the availability of agriculture produce by financing agricultural production and innovation at the farm/cooperative level (i.e. facilitates irrigation, greenhouse technology, use of certified seeds and fertilizers) and at the aggregation level, it provides safe harvest collection and linkage to market support and bolsters food accessibility.

KCB's lending model to the agriculture sector is based on farmers' production potential "*from farm to fork*", which requires an analysis of the whole value chain. For instance, after farmers harvest their crops, they need off takers who will supply it to processors. These off takers pledge how many Metric Tons (MT) they can provide to the processors and KCB uses this information to analyse the quantity which the processor will need

from off takers. The bank works with the whole value chain to determine farmers' markets and then use extension services to deliver the quantity and quality of production expected by members of the value chain. The payments from member to member within the value chain go through KCB. This organization of the value chain is necessary for KCB's financial activities. The bank has a staff team dedicated to agriculture that provides products for input financing, post-harvest financing (including warehouse receipt financing) and investment financing.

Lessons learned

Collaboration is the key

Considering that the bank does not have enough technical and financial capacity to mitigate all risks involved in smallholder farmers' financing, the support from stakeholders as risk mitigation service providers are critical. KCB partners with different stakeholders in order to achieve its lending agenda; for instance, it partners with:

- IFC to provide financing to producer cooperatives procuring maize for Africa Improved Foods (AIF Ltd).
- Input suppliers to resolve the issue of fund deviation when farmers request for a loan to purchase inputs. The bank collaborates with input suppliers and provides direct payment to farmers upon the proof that they indeed received the inputs;
- Technical assistance providers to prevent farmers from having a low yield or bad quality of harvest and side selling their produce. Thus, the bank collaborates so as to provide extension support, quality



checking and postharvest management and monitoring to farmers;

- Off takers to prevent payment deviation by providing forward contract and assignment of payment;
- Risk sharing providers to resolve the issue of limited collateral by ensuring that there is enough collateral to access loans;
- Agricultural insurance providers to mitigate weather related risks and diseases and make sure that the loan the bank provides is covered with an agricultural insurance.

In addition to this, the bank has spotted enabling factors that facilitates agriculture lending in Rwanda:

- Developing new products and services that better meet farmers' needs is important. Thus, given that agriculture related businesses have their own specificities the bank has specific products targeting agricultural value chain operators;
- Having services and products for clients in the agriculture sector is important, but insufficient to acquire new clients. Thus, providing an adequate training to the bank's staff is critical to enable them to effectively sell loan products to agricultural clients. Moreover, considering that they are dealing with seasonal businesses, they have to address issues quickly to meet customer expectations;
- Ensuring commitment at the bank's senior management level is key to agricultural finance success. Considerably, having a

well-defined agricultural lending strategy, policy and budget allocation is essential for the success of agricultural lending initiative.

- Last but not least, government interventions and commitment to support the agricultural sector is very important. The government's willingness to promote agricultural value chain finance and the investments done in agriculture somehow reduced the risks involved in lending to the farmers.

4.2.2.1. KCB MobiGrow

The concept of KCB MobiGrow began in 2016 through a partnership between the KCB Group and the MasterCard Foundation which set to finance the program over the next 5 years in Kenya and Rwanda. The platform aims at increasing access to finance by farmers that enable them to access loans more quickly and often immediately through the use of their mobile phones. In Rwanda the program started with the vision to enhance financial inclusion and to improve the livelihood status of the dairy and crop farmers over a 5-year period. More precisely, the objectives were to deliver an innovative and scalable digital financial solution in order to improve the productivity amongst rural agro-entrepreneurs, while facilitating improved access to produce markets and returns.

Overall, MobiGrow is part of on-going efforts of KCB to strengthen the agricultural value chain by providing innovative funding schemes and technical advisory services to small-scale farmers across the country. MobiGrow targets all value chains in agriculture from the bottomline of the agri-business players up to the end users; that is, basically, from smallholder farmers up to the agricultural

consumers. This ecosystem makes sure that every player in the value chain is defined by its role and how it interacts with the rest of stakeholders. Thus, it puts together input providers and aggregators, middlemen, processors and financial institutions (including insurance companies).

4.2.2.2. Description of KCB MobiGrow's Activities

The program is designed around 6 main activities, which are divided into two categories: Non-financial and financial activities:

To achieve these non-financial activities, KCB uses two approaches: the first one is partnership by providing strategic synergies and plug-ins to on-going initiatives with development partners, and extending the farmer production organizations with training of trainers (ToT) facilitation. The second focuses specifically on underserved categories by responding to their unique and challenging liquidity and growth needs, while transforming them into bankable clients and assisting farmers to safeguard the gains that will begin to accrue from an improved production level. KCB began by collecting bio-production data (i.e. land size and quantity individual farmers supply to their cooperatives per season) from cooperatives and recording it in the MobiGrow system. The development of MobiGrow then continued with the implementation of its non-financial activities, which mainly consist in the sensitization and training of farmers on good practices and in capacity building for farmer producer organisations.

The other part, financial activities, is scheduled to start in November 2018. It involves giving scores to farmers based on collected bio-production data and determining respective maximum lending amounts.

Non-financial part



A KCB MobiGrow training session. Source: KCB (2018)

The rationale here is that, before farmers can benefit from MobiGrow, the bank wants to assist them in increasing production, link them to markets, open an account for them, train them on how to make financial transactions using a mobile phone, etc.

- 1) **SMS and Financial trainings:** KCB provides sensitization services to farmers, helping them to build a strong relationship with the bank. KCB offers face-to-face training to cooperatives as well as SMS training during their daily activities. The bank finds that training farmers in the place of their daily activities is more effective than bringing them to community centres. This is because farmers can decide not to come to the centres and when they do come they may not get the most out of the program. Both face-to-face training and SMS training allows KCB to interact with farmers more on a case-by-case basis.
- 2) Through the texting service, farmers can send in questions and receive responses from KCB, simulating a face-to-face interaction.
- 3) KCB's non-financial services also include organizing exchange programs and facilitating



farmers to attend the Agri-show¹³, which is a type of a school for farmers where they can learn about new farming technologies.

All of these non-financial activities help the bank ensure that farmers are aware of MobiGrow and receive training before the bank can begin lending to them. All cooperatives around maize, potato, rice and dairy value chains registered with the Rwanda Cooperative Agency (RCA) are eligible for the benefits from KCB MobiGrow.

Financial activities¹⁴

The financial part of MobiGrow includes giving scores to cooperatives and farmers at the individual level regarding their management of loans and mobile loans. The process can be summarized in the figure below:

Figure 16: financial part of KCB MobiGrow



Source: KCB

The non-financial part provides bio data on farmers and this data is entered in the MobiGrow system. From there, a farmer can request for a MobiLoan. If the loan is for buying agriculture inputs, for example,

the amount will only be used for that purpose in collaboration with agro-dealers; if it is not used it goes back to the bank.

KCB's MobiLoan is a mobile platform through which individuals/farmers can access small agricultural loans. In order to access the loans, the farmer must be a KCB account holder for at least 6 months and/or be registered on KCB MobiGrow. Account holders who meet these requirements and have a good track record with their loans can access loans that vary between Rwf 500 and Rwf 500,000 on their mobile phones which is repayable after the agriculture season (30 days for dairy, 4 months for potatoes and 6 months for rice and maize).

The process is simple: once a customer is entered into the system, they can simply enter "*522#" or open the KCB Mobi App on their phone. They must then enter a password and follow KCB's prompts which will direct them to the selection of MobiLoan, enter the requested loan amount, select an account from which the money will be taken, and accept the terms and conditions. An SMS is then sent to confirm the request and the loan is immediately processed and, if approved, the requested sum is transferred to the customer's accounts with another SMS confirming loan approval.

Agricultural loans are available per season and MobiLoan follows the seasonality of crops so that KCB has details on every value chain. For instance, if a dairy farmer was to use MobiGrow and MobiLoan, KCB would visit a milk collection centre and go through its records to see how much that individual farmer is providing. This would then be entered into the MobiLoan system to determine the farmer's maximum loan amount. The loans for the next season become available when any outstanding loans are repaid. Moreover, KCB partners with UAP

¹³ This is an agriculture fair organized by MINAGRI aiming to prosper and flourish business and technology transfer in agriculture. It focuses on participation, exchange, forum, making trade talks, scientific and agricultural commercial exchange activities.

¹⁴ This part is supposed to be operating by the end this year; we will be then able to follow-up on its impact in the future edition of the book.



to offer insurance for these loans, acquiring a multi-peril plan for beneficiary farmers.

4.2.2.3. Factors of success

So far, KCB has signed with 174 cooperatives with 89,199¹⁵ farmers involved in the MobiGrow program. The factors that sustain this success can be summarized as follows:

Organization is key: The first lesson learned is that agriculture in Rwanda can be financed only when it is organized under value chains. Otherwise, farmers are scattered and unorganized without a sure market, which makes it risky for banks to lend to them. By involving the whole value chain, KCB facilitates negotiations and ensures a market for farmers, which in turn makes it easier for the bank to trust farmers enough to lend them money. This process builds relationships with farmers, whom KCB later expects to take more advantage of the bank's financial services. Practically, a mobile platform also decreases paperwork load. As it engages in agricultural financing, KCB finds that the process is best facilitated when the bank works with the whole value chain at once. Otherwise, organization and structure become difficult. Farmers have also benefited from KCB's non-financial services, which in turn promote their financial services.

First train then lend: Additionally, before lending to farmers, financial institutions need to train them on how to manage their loans, on good agriculture practices for ensuring the market, etc. That is why KCB partners with NGOs which support farmers.

Experience from other countries: The fact that KCB operates in other east African countries makes it easy for it to have supply of experts ready to provide knowledge to the bank and the farmers. It also partners with development partners such as IFC and WFP among others, so as to increase their network of information and support.

The bank's efforts to increase access to agricultural lending are driven by its emphasis on production potentiality rather than securities availability to determine maximum loan amounts. This is especially beneficial for the youth and women, for whom the general lack of securities has constituted a significant barrier to agricultural lending.

4.2.2.4. Challenges

KCB MobiGrow faces some constraining challenges under this product; these include:

Financial and technological literacy: Many of the farmers KCB works with do not have phones or do not know how to use them. Sometimes farmers seek help navigating MobiGrow from relatives, sharing password information in the process without understanding the risk this poses to their financial safety. In some cases, entire villages even have collective passwords, so when one farmer borrows money, another one can easily steal it. This significantly reduces financial autonomy. However, with financial literacy training KCB hopes to overcome this challenge.

Pressure to increase agricultural lending: This can pose problems for all financial institutions because, for them, the rights of the savers outweigh the rights of the borrowers. This means that these institutions do not want to give loans to high-risk borrowers because they must also prioritize

¹⁵ As per October 2018 figures.



the financial needs of those who trust KCB with their money. Additionally, the whole process of agricultural lending is more convoluted than many realize when taking into account all the details of the value chain. This can be frustrating for banks.

Insurance cost: Since KCB negotiates insurance for its farmers, it must make sure that they receive the best insurance plan possible. Rwanda is still developing much of the infrastructure that would protect crops against damage by floods, droughts, etc. and, since the majority of KCB's farmers are in marshlands, they need insurance against these losses even more. Insurance companies, however, are hesitant to provide this insurance because it incurs a large cost for them. The result is higher insurance costs for KCB.

Data availability: Most of the data KCB needs in order to evaluate farmers is available only at the cooperative level and is not specific for individual farmers. However, since the bank provides loans to individual farmers and not to cooperatives, this impedes the bank's process of determining loan amounts.

4.2.2.5. Development and sustainability

In the future, KCB hopes to expand its MobiGrow operations to include more value chains, to provide equal opportunity to all farmers regardless of the type of crop they produce. The bank will also continue its non-financial services, improving financial and technological literacy among their farmers with its sensitization efforts. KCB hopes that through this training, farmers will improve their financial safety and will have greater access to financial lending, which will hopefully lead to a general increase in commercial farming.

4.2.2.6. References

- KCB. (2018). *Kcb group plc investor presentation. q1 2018 financial results*. Retrieved from: <https://kcbgroup.com/wp-content/uploads/2018/05/Q1-2018-investor-presentation.pdf>, on 10th October 2018.
- KCB. (2017). *Integrated report and financial statements 2017*. Retrieved from: https://kcbgroup.com/kcb-report/images/KCB_INTEGRATED_REPORT_2017.pdf, on 06th September 2018.
- Business Daily Africa (July 2018). *KCB targets farmers with mobile loans*. Retrieved from <https://www.businessdailyafrica.com/corporate/marketplace/KCB-targets-farmers-with-mobile-loans/4003114-4652836-l49jbfz/index.html>, on 06th September 2018.



4.3. NAEB - FERTILIZER FUND: Value Chain Financing



Source: NAEB (2018)

National Agricultural Exports Board (NAEB) is a government institution that came into action in 2010 after a merger of 3 government companies: The Tea Authority (OCIR Thé), the Coffee Authority (OCIR Café) and the Rwanda Horticulture Development Board (RHODA). NAEB was created in order to efficiently manage these companies' operations and has a mission to facilitate the growth of the business and to diversify agriculture and livestock commodity export revenues. Some of its commercial functions include the following:

- to support value chain development for export commodities, conduct market research and risk analysis,
- provide market linkages,
- invest in shared infrastructure and export facilities,
- coordinate and facilitate negotiations for setting up and publishing the minimum farm gate prices for agricultural and livestock export commodities in collaboration with stakeholders, and
- ensure quality assurance and certification for compliance with international and local standards that are required to access the export market.



4.3.1. The fertilizer fund



Farmers applying fertilizers on a coffee plant. Source: Ruhango district images.

4.3.1.1. Coffee fertilizer fund

The coffee-export sector plays a key role in the country's economy, through its contribution to foreign exchange earnings and to the monetization of the rural economy. Currently, coffee is grown in most provinces of the country on a total area of 42,000 hectares and employs 400,000 smallholder farm families. The overall production currently varies between 16,000 MT and 21,000MT on a year basis. Most of the coffee is wet processed, usually at communal washing stations used by numerous coffee farmers. In 2017, coffee exports value reached \$64.12 million; this is equivalent to about Rwf 54.5 billion (BNR and RDB, 2018).

As part of its goal to support agricultural production, the Government of Rwanda established fertilizers funds. The idea was to efficiently collect contribution fees from farmers in exchange of inputs (fertilizers and pesticides) in order to make sure that farmers have access to fertilizers in the early stage of production and guarantee to increase productivity and production in the sector. The program started with the coffee value chain as a revolving fund in 2009, under the management of OCIR-cafe which would buy the fertilizers and sell them to

cooperatives and farmers on credit. When NAEB was created, it also took over the management of the fund.

However, some issues within this process were hindering the sustainability of the fertilizer fund. These include failure to timely distribute fertilizers, the management of funds, and the fact that some cooperatives were unable to repay back the loan. Therefore, coffee value chain stakeholders concluded that the management and the fund activities should be overseen both by NAEB and the Coffee Exporters and Processors Association of Rwanda (CEPAR). In 2014, NAEB transferred the management of the fertilizer fund to CEPAR.

CEPAR is a privately-owned association of farmers and exporters of coffee which was created in 2011 with the aim to increase efficiency and better integration of different stakeholders (farmers, washers, exporters, roasters, etc.) in the coffee value chain. In the management of the fund, CEPAR oversees the purchase, distribution, supervision, implementation and application of fertilizers and pesticide as well as reporting to different stakeholders. As for NAEB, it follows up with farmers through each step of the value chain to ensure that fertilizers are being distributed and used properly.

a. Process

Buying fertilizers

This stage involves CEPAR and fertilizer exporters; CEPAR makes sure that farmers and cooperatives get the quantity requested for and places the order to exporters. Once It has received the order, CEPAR distributes it to farmers/cooperatives.

Distribution and application of fertilizers

This stage requires the involvement of many stakeholders. CEPAR distributes fertilizers to farmers/cooperatives with the help of local authorities (at district and sector levels) and Coffee washing stations (CWSs) which are regrouped in a zoning program. Given the proximity CWS and factories have to the farmers, they work with them to make sure that they (farmers) apply the fertilizer correctly. Currently, there are over 270 CWS across the country and one coffee tree produces 2 or 3 kg while in general a tree production capacity can go up to 10 kg.

The coffee “zoning strategy” is an initiative of NAEB aimed at boosting coffee quality and quantity. The strategy calls upon CWSs and factories to extend their support to farmers in their respective geographical areas, through measures such as promoting fertilizer application, pests and disease control and management, weeding and pruning, as well as teaching them proper harvesting techniques. In addition, this strategy contributes to strengthening the relationship between farmers, CWSs and factories.

Value chain financing

Given that most farmers lack cash in the beginning of the season and fertilizers are costly (i.e. Fertilizers can cost up to Rwf 3,000 per kg), farmers buy fertilizers on credit and pay back after production. The process is rather straightforward since most of the time farmers sell their production to exporters/middlemen that must pass through the NAEB’s warehouses for coffee quality certification. Accordingly, NAEB can then collect fertilizers fund fees either at this stage or after the coffee is sold. The fees collected are more or less of Rwf 22 per kg

(prices can fluctuate but generally remain around this amount). The collected fees then go back to the fertilizer fund and are used to buy fertilizers in the next fiscal year.

Since the introduction of the coffee fertilizer fund, there has been a significant expansion in the use of fertilizers. The volume of fertilizer increased from 1,080 MT to 4,812 MT. In addition, the market demand has increased exponentially after farmers witnessed the benefits of using fertilizers. As seen in Figure 12, from 2012/2013 to 2017/2018, the fund value has almost doubled from Rwf 823,638,050 to Rwf 1,664,891,321. Moreover, thanks to the success of new policies put in place by CEPAR, the fertilizer fund has also managed to lower the cost of fertilizer by buying fertilizers in bulks, which facilitates negotiations.

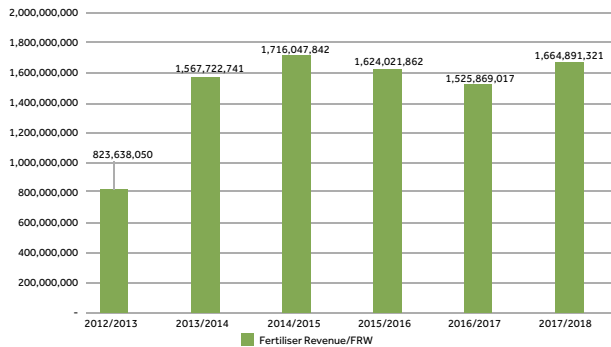
c. Challenges

However, despite massive improvements in the coffee fertilizer fund management, there are still several challenges that hamper the efficiency of the fund. They include:

Low productivity: Some farmers are still struggling with using general agricultural practices (that are not related to the application of fertilizers) effectively. This, along with climate change, leads to a low harvest. Since the share of fertilizer fund is deducted on the amount of exported Coffee, a weak crop yield in a season will lead to lower application of fertilizers in the following season, which can result into a vicious circle.



Figure 17: Total funds collected



Source: NAEB Fertilizer Fund presentation, June 14, 2018.

Late repayment: Given that the farmer's contribution is paid by the exporters, dishonesty by the latter can also hinder the efficiency of the fund. For instance, if they do not provide the contribution paid by farmers as they are expected to, it can result into unnecessary delays and coordination issues.

Market fluctuation: Farmers are highly sensitive to price fluctuations on the international market. As price takers, their total revenue will rise or fall after an increase or a decrease in the total demand. One consequence is that this renders financial planning and the availability of inputs uncertain. Following this, the fear of risk and increased loan interest rates due to payment default further complicates farmers' access to finance.

Misuse of fertilizers: Despite the fact that NAEB does carry out sensitization operations, many farmers underutilize fertilizer or deny their need for fertilizer in order to avoid the related cost. This problem can grow worse when farmers yield a good harvest and, therefore, think that they do not need fertilizer anymore.

Coffee smuggling: A non-negligible quantity of coffee produced does not pass through either

coffee washing stations or NAEB. This prevents NAEB from insuring the quality and managing the quantity of coffee nationally produced. It also prevents farmers from accessing high quality fertilizer when they are not contributing to the fertilizer fund.

Ageing Coffee Trees: Coupled with old landowners/farmers, coffee tree ageing is a challenge to the fund's sustainability. Therefore, there is a need to train and sensitize young people through cooperatives to cultivate new coffee trees.

4.3.1.2. Tea fertilizer fund

Production of tea was identified as a focus area in 2003 given the crop's importance as a leading export revenue generator in Rwanda. The Rwandan national tea strategy was then designed and aligned to the goals of Vision 2020. To achieve the Vision 2020 revenue targets, the tea industry needed each tea farmer to have 0.5 ha of tea plantation, with a yield of 10,000 Kg of green leaf /year/ha, and a green leaf price of Rwf 100 per Kg. The national tea strategy suggests that to achieve these targets, there is a need to improve harvest yields and quality, through better fertilizer application, training on plucking and pruning, and improved transportation. This is complemented by an increase of investments in factories both in terms of expansion of factory capacity to process the increased green leaf, and in terms of new types of processing to ensure product diversification.

In Rwanda, the tea sector has two supply models: cooperatives and industrial blocks. Around 69% acreage is under growers' cooperatives that are classified into two categories: (i) cooperatives with consolidated tea blocks and (ii) out-growers with scattered individual farms. The tea value chain



differs from coffee in the sense that each tea production must proceed through a factory to be refined and the same factory acts as the exporter and negotiator on the international market. There are a total of 15 tea factories in Rwanda, and most of these factories also oversee the fertilizer acquisition and distribution process with minor government contributions. Tea is cultivated mainly on large plantations, which are owned and managed by tea factories while there is still small amount of tea produced by tea cooperatives and small farmers. Overall the area under tea production is about 15,000 ha.

In terms of fertilization, tea is a perennial crop for which the vegetative part is constantly harvested and pruned; it requires a constant removal of major nutrients such that through fertilizer application tea producers have to constantly supplement removed nutrients for the crop to continue to grow. The tea fertilizer fund was first implemented in 2009 by tea stakeholders and supported by the Government of Rwanda to facilitate the process of acquisition of quality tea fertilizers and achieve economies of scale through a collective procurement of fertilizers. The Fertilizer Fund is now being managed by the joint committee composed of Rwanda Mountain Tea (RMT), the Rwandese Federation of Tea growers' cooperatives (FERWACOTHE) and NAEB.

a. Process

Fertilizer ordering

Every fiscal year, RMT and individual factories conduct soil testing in order to provide an accurate measure of fertilizers required. Then RMT calls out for bids from fertilizer suppliers. RMT acquires the fertilizers using the fertilizer fund and distributes it to factories, which also distributes it to

individual farmers and cooperatives. The farmer's contribution is collected at the refining stage. Unlike coffee, the contribution paid for the tea fertilizer fund fluctuates each fiscal year, considering that the fertilizer buying price is settled through an arrangement between the buyer and the seller depending on the amount of fertilizer needed. Therefore, the purchase of mineral fertilizers is usually done in bulk through the Tea Fertilizers Fund.

Distribution and application of fertilizers

Once RMT receives the order they distribute it to tea factories and cooperatives which are in charge of the fertilizer application.

Value chain financing

In terms of buying inputs, it is still challenging for some tea cooperatives to purchase sufficient quantities of fertilizers due to insufficient financial capacity. Therefore, with the fertilizer fund, all involved tea factories assist their cooperatives to get a free interest fertilizer loan which is reimbursed through deductions from the green leaf supplied by tea cooperatives to factories. Other cooperatives use either BRD loans or their own savings.

b. Impact

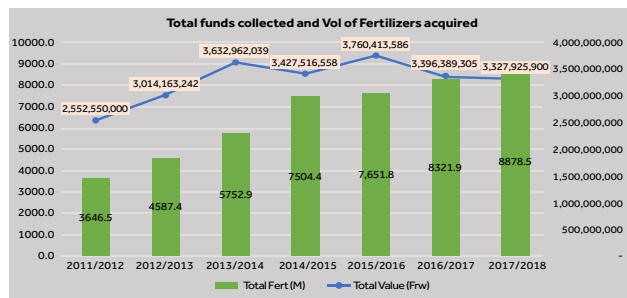
The product is currently performing well. The amount of fertilizers acquired and applied through the fund increased from 3,646.5 MT in the fiscal year 2011/2012 to 8,878.5 MT in 2017/2018. This implies an average annual growth of 15.9% while the performance in collecting funds rose from a total of Rwf 2.5 billion in the year 2011/2012 to Rwf 3.3 billion for the current fiscal year (2017/2018), implying an average annual growth of 5.4%. One major factor



to the fund's success is the large contribution of the tea factories and cooperatives to the fertilizer fund. This contribution has increased from 85.2% in 2011/2012 to 96.5% in 2017/2018. In addition, the fertilizer is bought in bulk, which reduces buying prices.

The impact is substantial: since 2017, tea export volume and value reached 26,243 tons and USD 84.27 million respectively. This growth was attributed to the tea price increase at the international market and to the increased production.

Figure 18: Funds collected, and volume of fertilizer acquired for tea fertilizer fund



Source: NAEB Fertilizer Fund presentation. June 14, 2018.

c. Challenges

Unstructured management: The main issue with the tea fertilizer fund is that it is not very well-structured; there are many stakeholders involved in this process, which complicates the overall management process of acquisition and distribution of fertilizers. In fact, in comparison to the coffee fertilizer fund, tea fertilizer application has increased at a lower rate.

Players using their own way of sourcing fertilizer: Tea factories and cooperatives are more likely to purchase their own fertilizers and are less reliant on government subsidy. On average, individual

tea owners are wealthier and can afford to acquire their fertilizers through private suppliers. There are also factories and cooperatives that choose not to work with NAEB and, instead, buy fertilizers from different sources. In this way, they do not contribute to the fertilizer fund. For instance, on a total of 7,985.04 MT of NPK fertilizers purchased in the whole tea sector, only 78.6% (6,277.72 MT) were purchased through the Tea Fertilizers Fund.

Other challenges include untimely payments by tea farmers, price fluctuations on the international market and non-participation of financial institutions in supporting tea production.

4.3.2. Future outlook

In time, NAEB hopes to reduce the burden of the agriculture sector on the government by incentivizing more players in the sector to take initiatives and support themselves with the help of more financial institutions. For now, however, it hopes that with more government funds and more investment, both tea and coffee farmers can increase productivity so that, when NAEB phases out, farmers will still manage to pay for fertilizer on their own.

NAEB also hopes to expand to the horticulture fertilizer fund. Currently, horticulture is a young industry with produce that is more fragile than tea or coffee, which makes it too costly and too risky. Horticulture producers are fragmented and are often not organized into cooperatives. This is an issue for banks because they prefer to work with cooperatives. NAEB is planning to create stronger market linkages between producers to boost exports.

NAEB also plans to go corporate, which will allow the organization to sell produce to supplement the government budget it uses to cover its own expenses. This, however, means that it will receive less government funding in the future.

NAEB has been working to alleviate coffee smuggling by strengthening the zoning policy, working with statistics to develop an e-system to report data on produce from farms through exportation, among other strategies. It also plans to increase encouragement, sensitization and engagement of financial institutions to invest in both tea and coffee fertilizer funds. For continued and greater success of the fertilizer funds, NAEB hopes to devise a more structured system to attract more farmers and cooperatives and ensure timely repayment.

4.3.3. References

- GAHIGI, M.K (2018, 11 March). Revenue sharing plan to increase tea production. *The East African*. Retrieved from: <http://www.theeastafrican.co.ke/rwanda/Business/Revenue-sharing-plan-to-increase-tea-production/1433224-4335692-g8qnv0/index.html> on 26 November 2018.
- Ntirenganya, E. (2018, 14 September). NAEB moves to enforce coffee zoning strategy to achieve export targets. *The New Times*. Retrieved from: <http://www.newtimes.co.rw/section/read/219883> on 26 November 2018.
- NAEB. (n.d). *National Tea strategy*. Retrieved from: www.naeb.gov.rw/index.php?id=45 on 20 October 2018.
- NAEB (2017). Annual reports 2016-2017.
- Rwanda Development Board. (n.d). *Product directory: Coffee sector*. Retrieved from: <http://rdb.rw/export/export/products-directory/coffee-sector/> on 15 September 2018



SECTION 5:

Problem Solving

From the first section we saw that post-harvest financing remains a key challenge in Rwanda. Financing post-harvest stages is as important as financing other production stages as most of the time farmers will pay back their loans with the money earned from their produce. This section presents the solution provided by the East African Exchange to address this challenge.¹⁶

5.1. About EAX

The East Africa Exchange (EAX) is a regional commodity marketplace created in 2013 to service about 173 million consumers in Rwanda and in the East Africa Community (EAC). The idea of having a commodities exchange and creating EAX was birthed in 2013 during the World Economic Forum in Davos, Switzerland. Its purpose would be to catalyze regional integration, capital market development and agricultural transformation in Africa. Eventually, EAX was officially launched by EAC Heads of State in July 2014, and is headquartered in Kigali. EAX is a Public-Private Partnership (PPP) between the Government of Rwanda (GoR) and private investors from Nigeria¹⁷ and the United States¹⁸.

Through its operations, EAX aims to:

- Increase liquidity in commodity markets and enhance price discovery;
- Improve existing value chains by linking production to high value markets;
- Increase the farmers' bargaining power and share of created value;

- Ensure integrity and transparency of trade and reduce default risk.

The EAX's vision is to create lasting institutions that will catalyze Africa's agricultural potential, support African farmers, achieve food security, and improve Africa's overall global trade competitiveness. EAX has the capacity to trade in auctions, spot contracts, forwards and futures. Its currently traded commodities are maize, beans, soya, sorghum, wheat and paddy rice. Feasibility and market studies are underway for minerals, tea and coffee auctions.

5.2. Problem statement and solution

At its inception, EAX was thought of as a typical commodity exchange where buyers and sellers interact to buy and sell through a technological platform. Unlike trading stocks, commodities are about preserving and guaranteeing the quality and quantity of what the buyer will receive at the end of a transaction. Hence, it was sensible for EAX to focus more on trading high quality commodities. To do so, EAX had to adopt a backward integrated holistic approach with farmers, who constitute the supply side of the market, to address four major problems: post-harvest loss, limited access to financing, limited access to markets and limited access to information.

5.3. Post-harvest losses

Post-harvest loss is defined as a degradation of both quantity and quality of food from the harvesting period in the field to the consumption (ACF, 2014). In Africa, estimates show that 40% of the harvested production is lost during the processing of the harvest, storage and transport from the field to the homes of the farmers and the market (GWPG, 2016; APHILIS, 2018). This results

¹⁶ This section was written in collaboration with EAX

¹⁷ Tony Elumelu through Heirs Holdings

¹⁸ Nicolas Berggruen through Berggruen Holdings and Jendayi Frazer through 50 Ventures



in the loss of calorific and nutritive value, loss of acceptability by consumers, damage of edibility of agriculture harvest and quantity reduction (Kader, 2005; WFP, 2017).

In Rwanda, it is estimated that over 25% of all grains produced are lost during post-harvest processes, and between 18% and 25.7% of maize harvest is lost each year from 2006. The identified causes of this problem include farmer's knowledge gap, transition from a humanitarian to a commercial approach, lack of adequate extension services in certain areas, lack of ample storage and packing technologies, lack of on-farm drying and storage facilities and poor market access and linkages (GWPG, 2016; USAID, 2012; APHILIS, 2018; GWPG; 2016).



Source: EAX (2018)

EAX has developed an integrated commodity warehouse infrastructure composed of 11 certified¹⁹ warehouses and silos with a total capacity of about 20,000 metric tons (MTs) spread around the country. Through these, EAX is able to guarantee the quality, quantity, ownership, security and insurance of the stored grains through world-class Collateral Management Services (CMS)²⁰. By grading products and assaying quality standards, higher-quality products command better prices on the market, creating an incentive for better post-harvest crop management.

¹⁹ Certification means these facilities meet international standards in grain handling and storage

²⁰ These include grading, weighing, cleaning, drying, stacking and fumigation of stored grains

In order to ensure that the quality of the grains is sustained throughout the value chain, from planting to harvest, EAX has put together a team of agronomists and agriculture technicians that engage with farmers on a daily basis. The team trains smallholder farmers grouped in cooperatives on proper grain handling and on best practices in agriculture, business planning, transport and logistics among others.

Key highlights

Total volumes gone through EAX warehouses to date	31,500 MT
Electronic warehouse receipts issued to date	602
Value of the receipts issued to date	4.9 million USD

As of end September 2018

5.4. Limited access to financing

The second major challenge that farmers in Rwanda have been facing is limited access to finance, caused by the following factors:

First, farmers have understandably got very high – sometimes unrealistic– expectations in terms of cash at harvest: indeed, there is typically about 4 to 5 months between planting and harvesting, during which farmers invest a lot of resources, energy and time. However, prices usually go down at harvest because of excess supply. Additionally, a readily available market offering rewarding prices for their crops is not always guaranteed, as middlemen habitually distort the market to rip farmers off.

Second, on the offtake side, agriculture commodity buyers (traders, off takers, agro-processors, etc.) often do not have all the required financial resources

to purchase the needed raw materials to cover the whole season. Thus they tend to lower prices to maximize their profits, at the expense of farmers.

Lastly, commercial banks perceive the agriculture sector as particularly risky, and smallholder farmers more so. It is estimated that less than 10% of all loans go to the agriculture sector, yet it constitutes more than 3/4 of the country's workforce and about 1/3 of the country's GDP. The lending requirements such as audited financial statements, sound governance structures, provision of collateral, securities and guarantees can be quite difficult for farmers to fulfill and/or access (CGAP, 2017).

EAX's solution



Source: EAX (2018)

Electronic warehouse receipt (eWR) as a financial instrument: in partnership with 7 commercial banks²¹ in Rwanda, a segment of the market that had been previously considered as very risky to lend to can now access short term loan using their electronic warehouse receipts as sole collateral. The guarantees that the warehouse receipts carry are the backbone of the trust which the banks have in the instrument. At disbursement, the value of a financed receipt is typically discounted by 30% as a cushion for recovery in case the market price depresses.

21 These banks are: Rwanda Development Bank (BRD), Guarantee Trust Bank (GT Bank), Equity Bank, Banque Populaire du Rwanda (BPR), Urwego Opportunity Bank, Ecobank and KCB Bank

Revolving fund: in an attempt to resolve the existing gap between the demand and supply, EAX has created a revolving fund in partnership with two financial banks (BRD and KCB). On the one hand, this has enabled EAX to provide a readily available market to farmers at harvest and, on the other hand, it has helped EAX to provide an assured supply of raw quality materials to off-takers to cover their needs for later in the season. This explains the 31% increase in volumes and revenues between 2016 and 2017.

Key highlights

Number of financial institutions that have participated in the warehouse receipt financing program to date	7
Value of loans disbursed under warehouse receipt financing to date	3,660,000 USD
Number of loan defaults to date	0
Average loan period	5 months

As of end September 2018

5.5. Limited access to markets

The third major challenge that farmers in Rwanda have been facing is limited access to commodity markets, caused by the following factors: First, access to markets which requires a certain level of organizational capacity, the ability to negotiate with market players, the ability to follow price and market trends, and the capacity to structurally organize the required logistics, all in the best interest of the members. Second, middlemen and buyers tend to distort the market price at the expense of farmers, as has been indicated earlier.



EAX's solution

Electronic warehouse receipt as a tradable instrument: one of EAX's mandates is to drive the structured trading of commodities in Rwanda and in the region. Thus, EAX has made trading of commodities transparent, equitable, easy and convenient, thanks to the electronic warehouse receipts. The seller does not need to carry the sample to potential buyers looking for a market since commodities are graded based on standards. The traded receipts have got guarantees on quality and quantity, which means that the buyers receive exactly what they bought. Finally, the settlement of trade does not exceed 2 days (T+2).

The NASDAQ Trading Platform: this world-class state of the art technology is capable of handling auctions, spot trading, forwards and futures. It is a robust system that has proved to be reliable and used on world-renown exchanges worldwide. This technology has empowered owners of the receipt to expand their market reach in an unprecedented way, as the platform can be reached from anywhere remotely.

Key highlights

Total volumes traded through EAX warehouses to date	25,500 MT
Number of trades that have taken place to date	256
Number of auctions that have taken place to date	52
Number of settlement defaults to date	0

As of end September 2018

5.6. Limited access to information

Information asymmetry is a major ingredient to the distortion of unstructured commodity markets and, most of the time, at the expense of rural farmers. One of the fundamental principles of an exchange is that information should be provided equally and equitably to all players in the marketplace so that they can make informed decision.

Price discovery: In playing the role of one central pricing reference point, EAX strives to transform agriculture and commodity trading by increasing the bargaining power of all players (from the demand, supply and financing sides) in general and that of small holder farmers in particular, through providing accurate and reliable information. This information is sent out via SMS, email and other online platforms.

5.7. Challenges

Although EAX has had some significant success, below are some challenges that still need to be addressed:

- **Knowledge gap by farmers:** Farmers still have a mindset of waiting for support for their daily living. Thus, a process of mind shifting for farmers is underway, from humanitarian, development and aid programs to running a business commercially.
- **Distress sales:** subsistence farmers sell only their surplus to meet their household immediate financial needs. The informal unstructured trading largely dominated by middlemen offers relatively little yet quick money and thus becomes attractive to farmers. However, this quick money does not necessarily cover the cost of production or give any

profit to the farmers. On the other hand, EAX operates within a structured framework that farmers might not have the necessary patience to go through, even though it may offer delayed financial benefits.

- **Fragmented supply from farmers:** farmer cooperatives are mostly loose structures. Therefore, it is difficult to collect significant volumes from cooperatives of which member farmers cultivate on small bits of land, and where the harvest is collected in small and scattered volumes. To address this problem, EAX has had to invest in transportation and logistics of commodities to speed up the harvest collection process, and thus minimize post-harvest losses.
- **Low risk appetite by banks:** banks largely remain very cautious with regards to lending to the agricultural sector, and more so when dealing with rural farmers.
- **The East Africa Community regional integration:** Rwanda is now competing with bigger economies such as Uganda, Kenya and Tanzania. For instance, Uganda produces 4 million tons of maize yearly, while Rwanda produces only 300,000 MT. It is for this reason that through EAX, Rwanda has decided to compete on quality.
- **Seasonality of the business and cash flow constraints:** EAX goes through tides of activities and cash flows because of the seasonal nature of the business: most warehouse activities and expenses take place within the first half of the year, whilst most of the revenues are generated within the second half of the year.

5.8. Future outlook

EAX has got strategic plans aimed at increasing penetration, nationally and regionally by acquiring more warehouses especially in strategic areas such as Kigali, as well as increasing its grain handling capacity through the acquisition of more equipment such as dryers and cleaners.

In addition to increasing ongoing operations, EAX plans to increase its products and service diversification: in addition to maize, beans, soya, wheat and sorghum, EAX is working on automating tea auction in partnership with NAEB. Market studies are also underway for pyrethrum and minerals. Developing the secondary market and futures is also another strategic objective for the Exchange.

5.9. References

- East Africa Exchange. *Regulation of the Rwanda capital markets*. Retrieved from www.ea-africa-exchange.com, on 28th June 2018.
- GWPG. (2016). Harvest losses high in Rwanda: How to turn post-harvest loss into income generation and food security. Retrieved from <https://www.globalcommunities.org/node/38301>, on 1st July 2018]
- MINAGRI (2018). National Post-Harvest Staple Crop Strategy. Retrieved from www.minagri.gov.rw, on 17th July 2018].
- The East African. (2017) East Africa's commodity market plan to expand. Retrieved from www.theeastafrican.co.ke/business, on 29th June 2018.



SECTION 6:

Forecasting Credit needs



This section aims at providing an indicator of the gap to bridge in order to reach a more efficient market in agriculture finance. Credit needs are forecasted using quantitative methods based on the EICV4 dataset, looking at what would be the agriculture loans needed in case of an increase in the real economic activity.²²

6.1. Determinants of participation in the market for agriculture credit

The aim of this chapter is to provide a projection of agricultural credit based on an assumed path for a real economic activity. Based on the descriptive analysis of Section 1, households were put into four clusters based on their credit status:

- Households that had outstanding loans at the time of the interview;
- Households that had debt within the previous 12 months, but had repaid everything at the time of the interview;
- Households that did not have a loan in the previous 12 months because they did not request for one;
- Households that did not have a loan in the previous 12 months because their loan application had been rejected;

Cross-sectional sample of the Integrated Household Living Conditions Survey for Rwanda for the years 2013-2014 (EICV4) was also used. Table 1 presents descriptive statistics of farm households' socio-economic characteristics in our sample.²³

²² This forecasting model was designed and applied with the support of RWI – Leibniz Institute for Economic Research

²³ For partially repaid agriculture loans, where the repayment amount exceeds the loan volume plus required interest payment, we set the outstanding loan payment to zero.



Table 3: Descriptive Statistics of households with outstanding loans

	Observations	Households in (000s)	Mean	Standard Deviation	Min	Max
Volume of unrepaid agriculture loans	812	134	32179	109950	300	3000000
Volume of partially paid agriculture loans	624	102	97408	459374	700	1.0*10 ⁷
Interest unrepaid agriculture loans	812	134	2946	20366	0	570000
Interest partially paid on agriculture loans	624	102	142827	3645385	0	1.0*10 ⁸
Repaid loan amount	624	102	311732	5173922	100	1.0*10 ⁸
Dummy had an agriculture loan	12701	2168	0.1042	0.3060	0	1
Consumption	12701	2168	259105	326482	21327	1.3*10 ⁷
HH size	12701	2168	4.6803	2.0642	1	18
Dummy has a savings account	12701	2168	0.4816	0.4997	0	1
Dummy female	12701	2168	0.2583	0.4377	0	1
Dummy rural area	12701	2168	0.9160	0.2775	0	1
Dummy went to school	12701	2168	0.7376	0.4400	0	1
Province						
Kigali City	12701	2168	0.0500	0.2180	0	1
South	12701	2168	0.2621	0.4398	0	1
West	12701	2168	0.2327	0.4226	0	1
North	12701	2168	0.1742	0.3793	0	1
East	12701	2168	0.2810	0.4495	0	1

Source: EICV4, author's calculations.



In the EICV4, households were asked to give information on indebtedness by reporting each loan they had within the previous 12 months. About 134,000 households had outstanding agriculture unpaid loans at the time of the interview. The mean volume was Rwf 32,179 and loan volumes differed considerably, ranging from Rwf 300 to Rwf 3 million. The initial loan volume of partially repaid loans was Rwf 97,408 on average. Differences in loan volumes were even more pronounced. The average agreed interest payment was Rwf 20,366 for un-paid and Rwf 14,2827 for partially repaid loans.

On average, about 10% of farm households had outstanding agriculture loan. Their aggregate consumption expenditures were equal to Rwf 295,105. On average, households consisted of 4.7 members. About 92% of households lived in a rural environment, for about 73% the head of the household went to school and 26% of farm households had a female head.

A multivariate logit model is used to investigate whether these socio-economic characteristics can explain the probability of a household belonging to one of the four credit groups constituted on the basis of socio-economic variables. The explanatory variables are (i) household specific characteristics (aggregate real household consumption expenditures, household size, and whether any member of the household has a savings account), (ii) socio-economic characteristics of the head of the household (whether the head is a male or female, whether the head went to school, and the interaction term between these two variables), and (iii) location specific characteristics (whether the household lives in a rural or urban environment and the province the household lives in).



Table 4: Multinomial Logit

	HH owed money in the previous 12 months – all repaid	No loan – did not request	Requested loan – rejected
Log consumption	1.40*** (0.11)	1.06 (0.05)	1.16 (0.11)
HH size	0.96* (0.02)	0.93*** (0.01)	1.01 (0.03)
Has savings account	0.75*** (0.08)	0.65*** (0.04)	1.86*** (0.26)
Dummy rural area	1.06 (0.28)	0.46*** (0.07)	0.64* (0.15)
Southern province	0.47* (0.21)	0.32*** (0.09)	0.28*** (0.10)
Western province	0.68 (0.30)	0.31*** (0.09)	0.29*** (0.11)
Northern province	0.81 (0.36)	0.31*** (0.09)	0.25*** (0.10)
Eastern Province	0.88 (0.39)	0.47*** (0.14)	0.36*** (0.14)
Dummy female	0.90 (0.19)	1.87*** (0.24)	0.99 (0.29)
Dummy went to school	0.85 (0.12)	1.05 (0.09)	1.20 (0.22)
Dummy went to school x Dummy female	0.84 (0.23)	0.62*** (0.10)	0.96 (0.33)
Observations	12 700	12 700	12 700

Source: EICV4, author's calculation.

Note: Relative risk ratios. *, **, *** respectively represent significance at the 1%, 5%, and 10% level. Clustered standard errors are in parentheses. Comparison to "No loan – did not request". Base category for province is "Kigali City".



Estimation results are presented in Table 6. Baseline category represents households that had outstanding debt when the interview took place. Coefficients represent relative risk ratios. By keeping other variables constant, it was possible to measure the amount of risk of the respective credit group changes given a one-unit increase in the respective variable relative to the baseline category which had outstanding agriculture loans at the time of the interview. To give a vivid example, given a 1% increase in consumption, the probability of belonging to the category of not having an outstanding agriculture loan as all loans have been repaid compared to having agriculture outstanding debt is multiplied by 1.4. Therefore, values larger than one indicate that an increase in the respective variable increases the probability of belonging to the group under consideration, relative to the base category. Values lower than 1 point to a decrease in the probability.

Real higher consumption expenditures at the household level seem to be associated with a higher probability of not having outstanding agriculture debt. Household size, living in a rural area as opposed to an urban area as well as living in the Southern, Western, Northern, or Eastern province as opposed to Kigali City are associated with a lower probability of having outstanding agriculture debt.

Having a savings account is ambiguous. It is negatively related to the probability of not having outstanding debt because it has been repaid or because the household did not apply for it. Households with savings accounts might have opened them because they just wanted to save, which is why they did not apply for a loan. On the other hand, a savings account is associated with a higher probability of the loan application being

rejected. One explanation might be that households that have a relationship with a bank are more likely to apply for a loan.

If the head of the household is a female, there is a higher probability of not requesting for a loan. However, if a household is headed by a female who attended formal education, this *Ceteris paribus* (c.p.) lowers the probability of not requesting for a loan.

6.2. Explaining loan volumes

Having investigated the extent to what differences in households' socio-economic characteristics correlate with households' credit status, the following analysis aims at explaining outstanding aggregate loan volumes and projecting them, based on an assumed path for a real economic activity²⁴.

Here, the focus is on measuring the outstanding agriculture loan volumes; that is the outstanding amounts of loan at the time of the interview. The initial loan volume is considered for non-repaid loans and the reported repayment is assumed to be the first redemption²⁵ for partially repaid loans. The loan volume is reduced if reported repayments exceed total interest payments by the respective amount. Total outstanding agriculture loans are given by the sum of unrepaid and adjusted partially repaid loan volumes.

With respect to consumption expenditures, the effect on loan volumes might be ambiguous. On the one hand, households that borrow higher amounts have c.p. more resources available that they can spend in the current period.

²⁴ We use the natural logarithm of the loan volume to circumvent heteroscedasticity issues.

²⁵ Reported average repayment amounts are well above 50 percent of the average loan volume, which drove us to make this assumption.



Therefore, consumption and agriculture loan volumes might be positively related. On the other hand, consumption expenditures are typically higher for the households that have higher income. The households that consume a lot might be less in need of borrowing or borrow lower amounts. Therefore, loan volumes might also be negatively correlated with consumption.

The household size has a positive correlation with loan volumes, given that larger households probably need more resources to make a living and, therefore, borrow larger amounts. The presence of a savings account is indicative of a bank-customer relationship, which reduces the extent of asymmetric information; therefore, they should also be positively related to loan volumes. The descriptive statistics in Section 1 showed that the households with female heads are less likely to borrow. Therefore, sex is also a factor that affects loan volumes negatively.

6.3. Loan volumes forecasting

To project aggregate loan volumes given an assumption with respect to real economic activity, three approaches were considered:

- ❖ The first approach is just a simple analysis explaining outstanding loan volumes based on the socio-economic characteristics. However, as we have to condition on households having outstanding loans, the time variable was not taken into account.
- ❖ The second approach is a two-step procedure. We first estimate the probability of a household having a loan. In the second step, we explain outstanding loan volumes as we do for the simple case (the first approach). The probability of a household having a loan is explained by all the variables discussed above plus education and sex of the head of the household, and location specific characteristics (the province in which the household lives and whether the household is in an urban environment or not).
- ❖ The third approach allow for non-random selection of borrowers by employing the Heckman selection model.²⁶ In the market for agriculture credit, participation might also be non-random. Literacy levels might affect individual reservation prices of loans. For example, if the borrower does not understand the terms of the loan contract, she/he might have additional costs to clarify these, which results in an increase in the loan's reservation price. In addition to that, reservation prices in rural areas might be higher, as the distance to lenders might be larger and the chance of choosing between different lenders might be lower. Therefore, to explain participation in the agriculture loan market we included: i) a variable indicating *the head of the households' literacy level* (whether he went to school); ii) variables indicating whether *the household is located in a rural environment* (base category in urban environment) and iii) in *which province the household lives* (base category is Kigali City).

²⁶ Its classic application is the estimation of female wage. If reservation wages for non-working females are higher than for working ones, e.g. because they are married or have to look after kids, restricting the sample to females that are working results in a sample selection bias. The Heckman approach corrects for this bias.

Table 5: Estimation results used to project agriculture loan volumes

	OLS	2stage model	Heckman
Log consumption	-4.66** (2.08)	-4.66** (2.08)	-1.54 (2.20)
(Log consumption) ²	0.20** (0.08)	0.20** (0.08)	0.08 (0.09)
HH size	-0.86** (0.40)	-0.86** (0.40)	-0.50 (0.41)
Log consumption x HH size	0.09*** (0.03)	0.09*** (0.03)	0.06* (0.03)
Dummy has a savings account	0.40*** (0.07)	0.40*** (0.07)	0.55*** (0.08)
Dummy female	-0.35*** (0.08)	-0.35*** (0.08)	-0.45*** (0.08)
Constant	35.07*** (13.15)	35.07*** (13.15)	13.76 (14.12)
Observations	1369	1369	
	OLS	2stage model	Heckman
Log consumption		3.09*** (0.81)	3.09*** (0.80)
(Log consumption) ²		-0.12*** (0.03)	-0.12*** (0.03)
HH size		0.38** (0.15)	0.37** (0.15)
Log consumption x HH size		-0.03** (0.01)	-0.03** (0.01)
Dummy has savings account		0.20*** (0.03)	0.21*** (0.03)



Dummy rural area	0.30*** (0.07)	0.29*** (0.07)
Southern province	0.52*** (0.13)	0.55*** (0.12)
Western province	0.54*** (0.13)	0.58*** (0.12)
Northern province	0.52*** (0.13)	0.52*** (0.12)
Eastern Province	0.32** (0.13)	0.35*** (0.12)
Dummy female	-0.28*** (0.06)	-0.27*** (0.06)
Dummy went to school	-0.02 (0.04)	-0.06 (0.04)
Dummy female x Dummy went to school	0.23*** (0.08)	0.20** (0.08)
Constant	-21.08*** (5.13)	-21.76*** 5.10
Observations	12 701	12 701
ρ		0.63*** (0.13)
σ		1.49*** (0.15)

Note: Base category province: "Kigali City". *, **, *** respectively represent significance at the 1%, 5%, and 10% level. Clustered standard errors in parentheses.

The forecast is based on the assumption that a 1% change in real economic activity translates into a 1% change in real consumption expenditures for each household. This allows computation of the probabilities that individual households have

outstanding agriculture loans according to the two-step and the Heckman approach and on the assumption that the composition of households that have loans is independent of real economic activity for the simple OLS approach.

Table 6: Projected changes in agriculture loan volumes

	OLS	2stage model	Heckman
Change in average probability		-0.04%	-0.03%
Change in loan volumes	10%	7%	7%

Note: Changes after a 10% increase in real consumption

Assuming a c.p. 10% increase in real consumption, aggregate loan volumes of agriculture loans might increase by a factor about one. Note that this effect is non-linear due to the specification of our models (see Table 3). We also have to stress that these projections are highly uncertain²⁷.

So, these projections actually tell us that we should expect a loan volumes increase by about 7% to 10% after an increase in aggregate consumption by ten percent.

However, it is important to stress that these numbers should by no means be understood as normative or even prescriptive statements. They should be understood as purely descriptive. These calculations based on EICV4 tell what historic loan volumes would be if consumption were different. Establishing whether loan volumes were sufficient at the time the households were interviewed or whether households suffered from credit constraints by then is beyond the scope of this project.

²⁷ We will briefly explain just two of potentially substantial draw backs of our projected loan volumes.

- First, the loan measure has been computed as described in this chapter due to the fact that data was not available. We state all the assumptions we employed and deemed them plausible. Of course, some other assumptions are possible and probably affect aggregate loan volumes as well as projected changes.
- Second, due to the lack of an intertemporal elasticity, we had to make the assumption that the cross-sectional elasticity of consumption expenditures on individual loan volumes that we observe in the EICV4 will also be valid if aggregate consumption expenditures increase.

