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Impact of Agricultural Value Chain Financingon Smallholder Farmers' Livelihoods

Case Study: Rwanda Rice Value Chain Financing illustrated by COOPRIKI- CYUNUZI Cooperative based in Gatore Sector, Kirehe District, Rwanda Eastern Province

A Master's Thesis submitted to the University of Rwanda in fulfillment of requirements for the degree of

Master of Business Administration (Finance)

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Kigali, June 2016

DECLARATION

I,**Kwizera Alice**, hereby declare that this thesis entitled **" Impact of Agricultural Value Chain Financing onSmallholder Farmers' Livelihoods "** is the result of my own academic work under the supervision of **Prof. Murty S. Kopparthi**, and contains no material previously published or written by another person except where due reference has been made in the text.

I also declare that this thesis has never been submitted to any other institution anywhere for the award of any academic degree, diploma, or certificate.

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CERTIFICATION

This is to certify that this thesis entitled "**Impact of Agricultural Value Chain Financing on Smallholder Farmers' Livelihoods**" was undertaken by**Kwizera Alice,** a student of theUniversity of Rwanda, College of Business and Economics,MBA Programme (Finance). This thesishas been submitted for examinationin fulfillment of requirements for the **Degree ofMaster of Business Administration (Finance)**and been approvedby the examination team**.**

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Signed :……..**Date:**……..

Prof. Murty S. Kopparthi, Supervisor

DEDICATION

I dedicate this piece of work to

The Almighty God

My Beloved Husband and Kids

My parents

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First off all, I am very thankful the Almighty God for his continual protection during my studies and life.

I extend my sincere gratitude to my supervior Prof. Murty S. Kopparthi for his guidance, patience and collaboration during the development of this thesis. I owe him my profound admiration and respect. I have appreciated his vast knowledge in the area of Agriculture Value Chain development and in thesis writing.

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May God bless you all abondantly.

ABSTRACT

Agriculture continues to be the backbone of economic system of developing economies and it is the predominant source of livelihood for people in the developing world, including Rwanda. It provides food, raw materials to the industrial sector, incomes and employment opportunities to a very large part of the rural population. Therefore, the Agriculture sector becomes the priority among others of those developing countries."Agriculture Value Chain Finance (AVCF) approach" has been reveiled very important in developing sustainable agricultural systems, expanding rural incomes, alleviating poverty and promoting financial inclusion, especially of the smallholder farmers engaged in agriculture activities.

This research study entitled **" Impact of Agricultural Value Chain Financing on Smallholder Farmers' Livelihoods"** presents opportunities and constraints that smallholder farmers are bearing in expanding their livelihoods by accessing to formal financial services through AVCF in rural areas. The case study is the rice cooperative called: "**COOPRIKI-CYUNUZI: Coopérative des Riziculteurs de Kibaya- Cyunuzi"**, based in Gatore Sector, Kirehe District of Rwandan Eastern Province.

This research sudy is developed around three main research questions:*(i)Are the existing alternative financial mechanisms, risk mitigation products and economic models for Value chain Finance approach work efficiently to raise the productivity and income growth for smallholder farmers? (ii)Which constraints are limiting smallholder farmers' accessing finance in Agricultural Value Chain model, and what can be done by stakeholders to overcome those constraints?(iii) How AVCF can impact the livelihoods of smallholder farmers and what should be the roles of different stakeholders in promoting this approach?*

The research is made up of five chapters. Chapter One provides the general introduction to the whole research project, and talks about the research problem, objectives, questions, scope of work, significance, theoretical framework, research design and methodology, and the thesis structure. Chapter Two is the literature review about the AVCF approach, financial tools and instruments, business models, main constraints in AVCF, etc. This chapter also reviews the case study: Rwanda Rice Value Chain Financing illustrated by COOPRIKI-CYUNUZI rice growers cooperative located in Kirehe District, in Eastern Province of Rwanda. Chapter Three shows the targeted population and sample, sampling techniques, methods and techniques that were used for data collection, data analysis, results' interpretation and presentation. In this regards, the targeted population was made up 2.856 smallholderfarmers growing the rice paddy in Kibaya and Cyunuzi marshlands, and members of COOPRIKI-CYUNUZI. The "convenience sampling" method was used to select a sample of 50 respondents within the cooperative and 5 other people from supporting institutions (development projects and FIs). Both qualitative and quantitative methods were used, a questionnaire was used to collect data, and coding process was used for results interpretation and presentation. Chapter Four talks about description and

presentation of data collected, and comments on findings. In conclusion, in Chapter Five, research findings and recommendations made to different stakeholders were used to answer the main research questions raised at the beginning of this research study, in Chapter One. Summary of findings of this research work were:

(i) COOPRIKI-CYUNUZI works in AVC model : the cooperative is linked to inputs suppliers. The cooperative supplies rice paddy to differents rice milling companies, and works with few Financial Institutions.

(ii) Both farmers and FIs expressed that farmers encountered constraints to access formal credit, such as: lack of collaterals, lack of guarantor, high interest rates, lack of skills to develop bankable proposals, etc.

(iii)COOPRIKI-CYUNUZI received both Government and Developement Agencies's financial support in forms of grants and Capacity building, as well as loans from few FIs. Farmers aknowledged that the financing received, even insufficient have mpacted positively their lives' standards. They aknowledged that by engaging them in rice production and working with FIs at some extent, they have increased access to health services, education services for their children, have acquired new assets (cattle, goats, motocycle, have rehabilitated their houses, etc).

At the light of those research's findings, the researcher formulated some recommendations to different stakeholders for the AVCF to work more efficiently and provide a positive impact on livelihoods of smallholder farmers:

(i) Governments, through police makers should take the lead by enabling a working environment for the AVCF through its legistration, promoting financial inclusion, and providing directions to other stakeholders.

(ii) Supporting agencies (Donor Programmes, NGOs and Development Programmes) have to take their facilitation role and make sure that the financial system provides adequate finance to AVC actors that meet demands arising from activities along the value chain through capacity building of smallholder farmers, promoting business models and enhancing sustainable market linkages between chain actors.

(iii) Finally, FIs have to play their role of expanding their lending opportunities in rural areas.They should promote easy access to financial services by smallholder producers and other value chain actors by availing sweetable financial products to meet their different needs along the chain.

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LIST OF ABBREVIATIONS AND ACRONYMS

AGF: Agriculture Guarantee Fund

AVC: Agriculture Value Chain

AVCF: Agriculture Value Chain Finance

BPR: Banque Populaire du Rwanda Ltd

CIP: Crop Intensification Programme

COOPRIKI-CYUNUZI: Coopérative des Riziculteurs de Kibaya-Cyunuzi

EAC: East African Community

EDPRS: Economic Development and Poverty Reduction Strategy

ENAS: Etablissement Nkubili Alfred and Sons

FAO: Food and Agriculture Organization

FI: Financial Institution

GDP: Gross Domestic Product

GoR: Government of Rwanda

IDS: Institute of Development Studies

IFAD: International Fund for Agriculture Development

ISAR: Institut des Sciences Agronomiques du Rwanda

KWAMP: Kirehe Community –Based Watershed Management Project

MDGs: Millennium Development Goals

MINAGRI: Ministry of Agriculture and Animal Resources

MINICOM: Ministry of Commerce

NGO: Non-Government Organization

PASP: Post-Harvest and Agribusiness Support Project

PRICE: Project for Rural Incomes through Exports

PSTA: Plan Stratégique pour la Transformation de l'Agriculture

RIF: Rural Investment Facility

RSB: Rwanda Standards Board

RSSP: Rural Sector Support Project

SPIU: Single Project Implement Unit

SPSS: Statistical Package for the Social Sciences

UNIDO:United Nations Industrial Development Organization

UOB: Urwego Opportunity Bank

USADF: United States African Development Foundation

VCDF: Value Chain Development Fund

WARDA: West Africa Rice Development Association

CHAPTER ONE: INTRODUCTION

1.1. INTRODUCTION AND BACKGROUND OF THE RESEARCH

In the developing world,agriculture plays a critical role in the entire life of the economy. It remains the backbone of economic system of developing countries.In addition to providing food and raw materials to the industrial sector, agriculture is the main source of livelihood of majority of rural polulation,providing employment opportunities to a very large percentage of population.For the 70 percent of the world's poor who live in rural areas, agriculture is the main source of income and employment(www.worldbank.org/Agriculture&Rural Development | Data - The World Bank).

In Rwanda, the government has a good governance and political will to develop the agricultural sector as it is being the economic backbone of the country by employing about 87% of the working population, producing around 46% of GDP and generating about 80% of the total export revenues(www.spaceoffice/Quick Scan Rwanda - Netherlands Space Office). Agriculture contributes immensely to Rwandan economy in many ways, such as, in the provision of food to the population; supply of raw materials and provision of markets to the industrial sector; a major source of employment generation, foreign exchange earnings, etc.

Under EDPRS II(2013-2017), the second phase of the Economic Development and Poverty Reduction Strategy ismoving towards achieving or surpassing the long-term targets of Vision 2020 and the MDGs. The overall goal of EDPRS II is to accelerate progress to middle income status and better quality of life for all Rwandans through sustained growth of 11.5% and accelerated reduction of poverty to less than 30% of the population." Rural development" is among the four thematic areas and priorities of EDPRS II: ***(i) economic transformation, (ii) rural development, (iii) productivity and (iv)youthemployment and accountable governance***.The first three priorities are particularly of relevance to the agricultural sector:

- **Economic Transformation** will operate diversification of the economic base and better external and internal connectivity, as well as the private sector investment in value chains and agri-processing facilities.
- **Rural Development's**targets are increased agricultural productivity to reduce poverty and rural infrastructure development to connect farmers to markets.
- **Youth and Productivity** aims at **s**kills development and sensitisation focused on youth, as well as supporting entrepreneurship, access to finance and agri-business development.

Therefore, Agriculture is recognized in EDPRS II as a priority sector of the economy that will both stimulate economic growth and make the greatest contribution to poverty reduction withmain objectivesof increasing rural households' incomes,providing incomes from diversified sources, and increasing food security.

In order to implement the ambitious targets of EDPRS II and Vision 2020 of reducing poverty and making a significant positive impact on the population, particularly those living in rural areas, the Ministry of Agriculture and Animal Resources (MINAGRI) has developed an internal sector strategy, the " Strategic Plan for the Transformation of Agriculture in Rwanda" or "Plan Stratégique pour la Transformation de l'Agriculture au Rwanda" – PSTA.

The strategic vision for the current third generation of the Agriculture strategy, PSTA III in the next five years is a focus on both increased production of staple crops and livestock products, and greater involvement of the private sector to increase agricultural exports, processing and value addition. Investing in high-value crops while also exploiting the opportunities offered by staple crops is key for the future, facilitating both domestic food security and higher rural incomes.

« Value Chain Development and Private Sector » constitues the third Programme of the PSTA III, **Sub-Programme3.7. Agricultural Finance**aims at improving financial services in rural areas,strengthening, expanding and introducing new agricultural finance instruments by implementing main lines of Action, (PSTA III), respectively:

- Consolidate SACCOs at the District level under an Agricultural Cooperative Bank
- Establish a warehouse receipts system
- Expand agricultural insurance and rural finance
- Facilitate value chain finance relationships

In light of the above GoR's initiatives, **Agricultural Value chain development and financing approaches** becomes absolutely a tool that can boost the development of the Agriculture sector and increase incomes of rural active households engaged in farming activities.

Adequate and timely financial services through "Value Chain Finance" can help farmers to raise productivity,make optimal use of value addition, open market opportunities for their produces; and therefore, improving their livelihoods.

This research aims especially to explore those facts trough Rwanda Rice Value Chain financing experience illustrated by COOPRIKI-CYUNUZI Cooperative, a cooperative of rice growers based in Kirehe District, Eastern Province.

1.2.RESEARCH PROBLEM FORMULATION

This sectionprovides an introduction for the formulation of the research objectives and questions which aim at highiliting most important challenges that smallholder farmers are facing in accessing financial services in the agriculture sector and seeking to show the impact of the financing received in the AVCF model on smallholder farmers.

In the 21stcentury, agriculture continues to be a fundamenta instrument for sustainable development and poverty reduction. Three of every four poor people in developing countries live in rural areas, 2.1 billion are living on less than $2 a day, 880 million on less than $1 a day and most depend on agriculture for their livelihoods (www.cynosure-consultants, Agriculture Development). Majority of rural small farmers depend on related subsistence farming activities. They live in precarious conditions, threatened by lack of income, shelter and food, medical services, education of their children and other basic needs. To overcome povertyand be able to improve their livelihoods, they need to borrow money for investing in their lands exploitation, making savings to protect their families against risks.

Therefore, increasing finance in the agriculture sector is the way of lifting smallholder farmers living in extreme poverty towards a sustainable development. Financial practitioners worldwide have set a number of initiatives to increase the supply of finance to the agriculture sector; "Agriculture Value Chain Finance" approach is at the center of the heart, absolutely as a necessity to the economic growth in the development world.

Rwanda hasn't been left behind in promotingagriculture financing. In light of the PSTAII, Sub-Programme 3.6:Strengthening rural financial systems,the GoR has made substantial efforts to build sustainable rural financial systems that provide access to financial services for rural people, through establishment of numerous credit enhancing vehicles such as, special funds and lines of credit, RIF1 and RIF2, Agricultural Guarantee Fund(AGF), Crop and Livestock Insurance, etc.Other financial facilities are provided by MINAGRI's agenciessuch as,the Performance-Based Grant and Guarantee facilities provided by PRICE Project to support Horticulture, Tea and Coffee sectors 'development, Post-Harvest Grant and Guarantee facilities, Climate-Resilient Grant, both provided by PASP Project, the Value Chain Development Fund

Grant Facility(VCDF) provided by KWAMP Project. KWAMP, PRICE and PASP are both IFAD supported agricultural development projects involved in value chain development and based in IFAD/MINAGRI Single Project Implementation Unit(SPIU) of Land Husbandry, Watershed Management & Value Chain Development-SPIU(KWAMP-PRICE-PASP). All of them are intended to enable farmers accessing credits at favorable rates.

Despite all these efforts mobilized by the GoR to promote agriculture financing in Rwanda, the agriculture sector in Rwanda remains generally perceived by the financial sector as very risky; challenges inherent in the value chains hinder flow of finance. Most of agricultural projects in Rwanda are poorly financed with scarce specialized products. Due to lack of collaterals, low productivity and production, unpredictable climate changes, inadequate storage and processing, and market uncertainties, access to finance becomes very limited. Especially, smallholder farmers engaged in primary production, but without adequate collaterals frequently complain about a lack of access to working capital loans needed to buy and apply inputs and fertilizers, pay labor for the land preparation and maintenance, prepare the harvest, and handle the produce to meet the markets, etc. Farmers also need long term finance to invest in post-harvest infrastructures and marketing They also need other basic related services such as crop insurance, savings, transfers, potentially needed to support investments along the chain.

That is the case of COOPRIKI-CYUNUZI rice cooperative based in Kirehe District, Eastern Province of Rwanda which is the case study of this research. The cooperative received numerous Governmentand affiliated agencies'financial support, as well as loans from local Financial Institutions to implement rice paddy production's activities along the chain.

In summary, in the period covering Season B 2014 to Season A2016, the cooperative received total financial support worth Frw 1.192.602.940 for value chain activities from different sources: Government, Development agencies and FIs:

- Governement and affiliated agencies, as well as FIs invested total funds worth Frw 988.680.000 to finance inputs acquisition for COOPRIKI-CYUNUZI's members.

- Field operations during 6 months of rice production have been financed from the same institutions with an insignificant amount totaling Frw 131.305.000 compared to inputs acquisition for the same period.

- Funds received by the cooperative from those financing institutions (GoR, develpment agencies and FIs) for Post-Harvest activities and investments are totaling Frw 385.922.940.

- Lastly, paddy product marketing and selling activities received total funds equal to Frw 190.000.000, including loans from FIs, Government and development agencies' financial support.

Despite the fact thatdifferent financing institutions have invested these funds in COOPRIKI-CYUNUZI value chain's activities, no study has been ever conducted to find out which challenges that rice producers are encountering in credit acquisition and the impact of this financing received on the livelihoods of beneficiaries who are the cooperative's members.

That is the motivation of the researcher to conduct this study in COOPRIKI-CYUNUZI in order to complement other studies that have been done on challenges that exist in accessing finance in the AVCF model, but most importantly, how the financing received along the chain can impact small rural farmers in light of rice producersworking together in COOPRIKI-CYUNUZI.

Subsequent research objectives and questions of the research problemare outlined in sections below and they are designed to assess constraints for smallholder farmers in agricultural value chain financing and to explore opportunities for farmers to earn more incomes and improve their livelihoods through agriculture value chain financing approach.

I.3. RESEARCH OBJECTIVES

I.3.1.General objective

This study on "**Agriculture Value Chain Finance**" aims at exploring different strategies,models, instruments and tools which can help small scale farmers in improving access to finance for agriculture commercially-oriented investments. It will contribute in assessing opportunities and main constraints that farmers are facing in accessing finance required to carry out different activities along the chain, and it will contribute in proposing ways to overcome some of those constraints.

I.3.2. Specific Objectives

- ✓ To identify constraints that are faced by smallholder farmers in credit acquisition,and propose alternative solutions to overcome those constraints.

- ✓ To provide an analysis of impact of AgricultureValue Chain Financeon smallholder farmers 'livelihoods.

- ✓ Define roles of stakeholders in promoting the AVCF approach.

I.4. RESEARCH QUESTIONS

In this study, in order to achieve the above objectives, three main research problems are expected to be answered:

- Are the existing alternative financial mechanisms, risk mitigation products and economic models forValue chain Finance approach work efficiently to raisethe productivity and income growth for smallholder farmers?

- Which constraints are limiting smallholder farmers' accessing finance in Agricultural Value Chain model,and what can be done by stakeholders to overcome those constraints?

- How AVCFcan impact the livelihoods of smallholderfarmers and what should be the roles of different stakeholders in promoting this approach?

I.5. SCOPE OF THE RESEARCH

This research will discuss the Agriculture Value Chain Finance approachin general. Focus will beconfined to the "Rice Value Chain Finance experience in Rwanda", with the illustration case of a selected Rice growers Cooperative, COOPRIKI-CYUNUZI based in Kirehe District, in eastern Province of Rwanda. It will illustrate opportunities and constraints thatrice growersin COOPRIKI-CYUNUZI are facing in accessing finance for different needs during rice production process, in harvest and post-harvest period, and during paddy commercialisation. COOPRIKI-CYUNUZI Cooperative will serve as the case study to illustratethe impact of financing received on the livelihoods of rice growers who are engaged in different activities carried out along the chain.

1.6. SIGNIFICANCE OF THE STUDY

In addition to other researches that have been conducted on this topic, this study is proposed to provide a contribution that can help policy makersin designingnew strategies with regard to the agriculture sector development, using the « Value Chain Finance Approach ».Furthermore, it will contribute to help agriculture finance proctionners to better understand different lending mechanisms appropriate to agriculture investment in value chain models.

Personally, in my position of researcher, the study will enrich the practical and theoretical experience I already have in the field of agriculture sector finance.

1.7. THEORITICAL FRAMEWORK

The role of agriculture value chain finance is to address the needs and constraints of those involved in that chain. This is often a need for finance but it is also commonly used as a way to secure sales, procure products, reduce risk and/or improve efficiency within the chain.

Therefore, atheoretical framework is useful for understanding value chain finance approach.This is important because value chain finance is both an approach to financing as well as a set of financial instruments which are utilized to expand and improve financial services to meet the needs of those involved in the valuechain.

This study will focus on documented theories and models related to Agriculture Value Chain Finance, specifically, on concepts telling about agriculture value chain models, financing tools and instruments, constraints and benefits provided buy**AVCF** to smallholder farmers.

I.8. RESEARCH DESIGN AND METHODOLOGY

The research will be based on the conceptual framework of « Agriculture Value Chain Finance » and its general impact on smallholder farmers'livelihoods. Specifically, this study will highlight the application of the AVCF approach, its issues and benefits on lives' tandards of smallholder farmers and members ofCOOPRIKI-CYUNUZI cooperative based in Cyunuzi village, Gatore sector, Kirehe District, Eastern Province of Rwanda, growing rice in Kibaya and Cyunuzi marshlands.

Therefore, both qualitative and quantitative methods will be used to gather relevant primary and secondary data from existing related documents, as well as directly from smallholder farmers operating in COOPRIKI-CYUNUZI and close support agencies 'staff.

Primary data will be collected directly from respondents through a questionnaire. A structured questionnairewill be distributed to an expected sample size of 50 respondents that will be selected from a population of 2.856rice growers of COOPRIKI-CYUNUZI Cooperative, and 5 respondents will be selected from banks 'officials and developing agencies 'staff that have been working closely with the cooperative.

By using the "Convenience Sampling" technique, the researcher will determine the farmers to be selected, using the list of the population provided by the Cooperative Management. Participation to respond to the questionnaire will be on voluntary basis. Therefore, any refusing participant will be replaced by another one using the same process.

Secondary data will be collected from books, research articles published in professional journals and websites, government documents, etc.

Collected data analysis will be performed using the " Codification" and "Thematic Analysis" methods to provide results interpretation and drawing recommendations and conclusion.

I.9. THESIS STRUCTURE

This study is outlined into five chapters as follows:

Chapter 1: Introduction to the Agriculture Value Chain Study. It gives the overall idea about the whole research project, including the research problem, objectives, questions, scope of work, significance, theoretical framework, research design and methodology, and thesis structure.

Chapter 2:Literature review. Mainly, this chapterwill encompass an overview of documented theories and models relating to Agriculture Value Chain Financing, tools and instruments of Agriculture value chain financing used, impact of the AVCF on small scale farmers 'livelihoods. It will provide also an overview of the Rice Value Chain in Rwanda.

Chapter 3: Research methodology. This chapterwilldiscuss the relevance of the methodology and research design of this study. It will spell out the: (i) study area, source of data, methods and

techniques that will be used in data collection, (ii) targeted population, sample and sampling techniques that will be used, and (iii) techniques that will be used for data analysis, results' interpretation and presentation.

Chapter 4:Research findings. This chapter will talk about the description of the datacollected and comment on findings from the analysis of those data collected.

Chapter 5: Conclusion. The chapter will summarize the most important elements of findings described in chapter Four. From the findings, a general conclusion and general recommendations will be formulated to answer the main research questions.

CHAPTER TWO: LITERATURE REVIEW

2.1. INTRODUCTION

The literature review of this study presents core concepts and issues related to "**Agriculture Value Chain Finance Approach"**.Numerous concepts and approaches in this area have been designed by different practitioners in agriculture development to address constraints that smallholder farmers are facing in accessing finance needed for their agriculture investments.

The literature consulted different sources; books, workshops and conferences reports from the agencies and organizations involved in supplying financial services to agriculture investments in developing countries, journals, websites, etc.The literature focuseson main themes discussed, such as: definitions, theories, models, which will contribute to answer the main questions of this research, and make appropriate recommendations with regard constraints farmers are facing in accessing financial services while investing in their agri-businesses toraisetheir levels of incomes.

2.2. DEFINITIONS AND TERMINOLOGY OF KEY-TERMS IN AVCF

2.2.1. Value Chain Concept

Different authors have described the "**Value Chain approach"** to explain its relationship to the economic development in addressing the major constraints and opportunities faced by businesses'promoters at multiple levels along the value chain.

The value chain concept allows integration of the various players in agriculture production, processing and marketing. It defines the various roles of players while at the same time, scope and purpose of partnerships that can be established (Equity Bank-Kenya, Muiruri, 2007).

Widely, the term *"Value chain"* is used to describe the all activities and services that bring a product (or a service) from its conception to the end use in a particular industry, from input supply to production, processing, wholesale and finally, retail markets, where value is being added to the product or service at each step along the chain.

2.2.2. Agriculture Value Chain(AVC)

The AVC is about actors (private and public, including service providers) and the sequence of value-adding activities involved in bringing a product from production to the end-consumer. In

agriculture, they can be thought of as a "farm-to-fork" set of inputs, processes and flows (Miller and da Silva, 2007).

The chain comprises different chain'sactors;it starts by inputs suppliers, producers, producer groups, traders or aggregators, processors, and retailers/wholesellers and consummers/exporters. The Agriculture Value Chain involves the sequential linkages between chain actors and a set of activities that bring a basic agricultural product from production in the field to final consumption (ADB Group, Alex Rugamba & Peter Noni, 2013).

Each VC actor has distinct characteristics and financing requirements. A producer will require finance for farm investments or inputs, while the requirement for those engaged in processing/packaging will require a large long-term credit and equity for investments in plant, machinery and buildings. The requirements will vary for different actors within each category as well. For example, the need for finance will vary between the large farmer and marginal farmer, depending upon the farm size. A large farmer will require higher credit to purchase heavy machinery, while the marginal farmer will require credit to purchase inputs like seed, fertilizer, and pesticide. That is the rationale of **"Agriculture Value Chain Finance Approach".**

2.2.3. Agricultural Value Chain Finance (AVCF)

The term **"value chain finance"** refers to the flows of funds to and among the various links within a value chain. It relates to any or all of the financial services, products and support services flowing to and/or through a value chain to address the needs and constraints of those involved in that chain, be it to obtain financing, or to secure sales, procure products, reduce risk and/or improve efficiency within the chain(IFAD, Calvin Miller,2012).

It refers to both internal and external forms of finance:

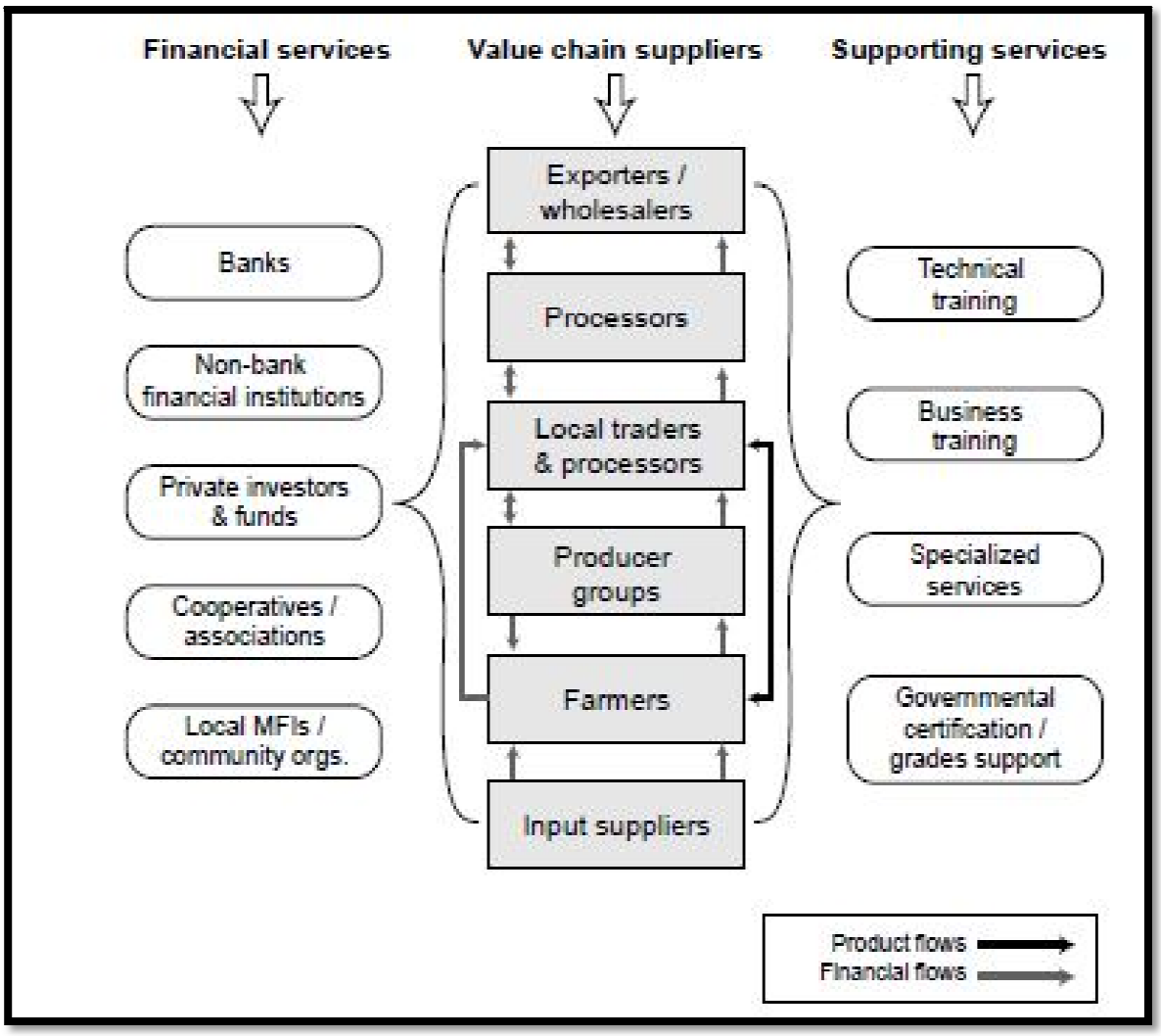
- **Internal value chain finance** is financing that takes place within the value chain, such as when a supplier provides credit to a farmer or when a lead firm advances funds to a market intermediary.

- **External value chain finance** is financing from outside the chain made possible by value chain relationships and mechanisms; for example, when a bank issues a loan to a farmer based on a contract with a trusted buyer or a warehouse receipt from a recognized storage facility, or when, the bank advances funds against an assignment of future receivables from the buyer, and factoring in which a business sells its accounts receivable at a

discount. Also falling under value chain finance: asset collateralization such as on the basis of warehouse receipts, and risk mitigation, such as forward contracting, futures and insurance.

Figure 1.1. illustrates the AVC framework, it illustrates that finance is provided by those within the value chain itself, as well as by various types of institutional financing entities who provide financing to the chain. Products flow in one direction through the chain with varying levels of value addition at each level.Within the chain the finance flows in two directions, depending upon the particular value chain and/or region and the dynamics of the companies and participants involved.

Figure 1.1.: Product and financial flows within the AVC



Source: Calvin Miller and Linda Jones,2010

2.2.4. Identifying value chain financing needs

Actors in the various segments of the VC require finance to buy inputs, expand field operations, transform products, upgrade or explore new markets. Financing needs vary within the value chains. Therefore, the starting point of designing appropriate matching financing instruments is the identification of different needs at each segment of the agriculture value chain.The table 2.1. provided below describes the typical financing that could respond to different needs along the AVC.

Table 2.1.: Financing needs and corresponding types of finance in VC segments

Need	Purpose	Type of finance
Input Industry	Working capital (includingcredit to customers)	• Overdraft • revolving credit line • Asset-based finance – factoring (accountsreceivable), inventories, etc
	Fixed assets (plant, property)	• Termloan • Commercial property finance
Primary Production	Inputs/land preparation	• Short-term agricultural production loan • Revolving credit line • Supplier credit (from input industry) • Advancepayment (from processors)
	Operating expenses	• Short-term agricultural production loan • Revolving credit line • Supplier credit • Advancepayment • Warehousereceipt system
	Equipment	• Termloan • Vehicle&asset finance (leasing, rental, instalment sales)
1st/2nd Level Processing	Working Capital (including advance payments to suppliers)	• Overdraft, Revolving credit line • Asset-based finance – factoring (accountsreceivable), inventories etc
	Fixed Assets (plant, property)	• Asset finance (leasing, rental, installment sales) • Commercial property finance (warehouses, factories, industrialpremises)
	Equipment (machinery, capital equipment)	• Termloan • Vehicle&asset finance (leasing, rental, installment sales)
Wholesale, Retail & Marketing	Working capital	• Overdraft • Revolving credit line
	Fixed Assets (incl.wholesale warehouses, transport vehicles etc.)	• Termloan • Commercial property finance • Vehicle&asset finance
	Working capital (pre- and post-shipment)	• Export credit line • Letter of credit/forfaiting • Bills of exchange • Factoring
Export	Working capital (pre- and post-shipment)	• Export credit line • Letter of credit/forfaiting • Bills of exchange • Factoring

Source: UNIDO: Unleashing Agricultural Development in Nigeria through VCF. Working Paper, November 2010

2.2.5. Financial iinstruments used in Agricultural Value Chain Finance

AVCF is an approach to financing. An understanding ofproduction process, products value-addition and marketing processes can help to determine the financial needsof actors in the chain and how best to provide matching financing support.In that respect, innovative financial instruments (products) may be developed and applied or adapted tomeet those specific financial needs identified along the chain.Calvin categorizes them into five categories, summarized in table 2.2. (Calvin Miller, 2012).

Table 2.2.: Categories of financial instruments commonly used in agricultural value chain finance

Category	Instrument
A. Product financing	•Trader credit • Input-supplier finance • Marketing and wholesale company finance • Lead-firm financing
B. Receivables financing	• Trade-receivables finance • Factoring • Forfaiting
C. **Physical-asset collateralization**	• Warehouse receipts finance • Repurchase agreements (repos) • Financial leasing (lease–purchase)
D. **Risk mitigation products**	• Insurance • Forward contracts • Futures
E. **Financial enhancements**	Securitization instruments • Loan guarantees • Joint-venture finance

Source: Ag VCF Strategy And Design, Technical Note, Calvin Miller, 2012)

2.2.5.1. Product financing

- ✓ ***Trader credit***:Traders advance funds to producers to be repaid, usually in kind, atcredit harvest time. This allows traders to procure products, and provides afarmer with needed cash (for farm or livelihood usage) as well as aguaranteed sale of outputs. Less commonly, trader finance can also beused 'upward' in the chain whereby the trader delivers products tobuyers with delayed payments.

- ✓ ***Input supplier credit***:An input supplier advances agricultural inputs to farmers (or others in the VC) for repayment at harvest or other agreed time. The cost of credit (interest) is generally embedded into the price. Input supplier credit enables farmers to access needed inputs while increasing sales of suppliers.

- ✓ ***Marketing company credit***: A marketing company, processor or other company provides credit in cash or in kind to farmers, local traders or other value chain enterprises. Repayment is most often in kind. Upstream buyers are able to procure outputs and lock in purchase prices and in exchange farmers and others in the value chain receive access to credit and supplies and secure a market for selling their products.

- ✓ ***Lead firm financing***: A lead firm either provides direct finance to value chain enterprises including farmers, or guaranteed sales agreements enabling access to finance from third party institutions. Lead firm financing, often in the form of contract farming with a buy-back clause, provides farmers with finance, technical assistance and market access, and ensures quality and timely products to the lead firm.

2.2.5.2. Receivables financing

- ✓ ***Trade receivables finance***: A bank or other financier advances working capital to agribusiness (supplier, processor, marketing and export) companies against accounts receivable or confirmed orders to producers. Receivables financing takes into account the strength of the buyer's purchase and repayment history.

- ✓ ***Factoring*** : Factoring is a financial transaction whereby a business sells its accounts receivable or contracts of sales of goods at a discount to a specialized agency, called a factor, who pays the business minus a factor discount and collects the receivables when due. Factoring speeds working capital turnover, credit risk protection, accounts receivable bookkeeping and bill collection services. It is useful for advancing financing for inputs or sales of processed and raw outputs that are sold to reliable buyers.

- ✓ ***Forfaiting***: A specialized forfeit or agency purchases an exporter's receivables of freely-negotiable instrument(such as unconditionally-guaranteed letters of credit and 'to order' bills of exchange) at a discount, improving exporter cash-flow, and takes on all the risks involved with the receivables.

2.2.5.3.Physical asset collateralization

- ✓ ***Warehouse receipts***: Farmers or other value chain enterprises receive a receipt from a certified warehouse that can be used as collateral to access a loan from third party financial institutions against the security of goods in an independently controlled warehouse. Such systems ensure quality of inventory, and enable sellers to retain outputs and have opportunity to sell for a higher price during the off-season or other later date.

- ✓ ***Repurchase agreements (repos):*** A buyer receives securities as collateral and agrees to repurchase those at a later date. Commodities are stored with accredited collateral managers who issue receipts with agreed conditions for repurchase. Repurchase agreements provide a buy-back obligation on sales, and are therefore employed by trading firms to obtain access to more and cheaper funding due to that security.

- ✓ ***Financial lease (lease- purchase)***: A purchase on credit which is designed as a lease with an agreement of sale and ownership transfer once full payment is made (usually in installments with interest). The financier maintains ownership of said goods until full payment is made making it easy to recover goods if payment is not made, while allowing agribusinesses and farmers to use and purchase machinery, vehicles and other large ticket items, without requiring the collateral otherwise needed for such a purchase.

2.2.5.4.Risk mitigation products

- ✓ ***Insurance:*** Insurance products are used to reduce risks by pooling regular payments of clients and paying out to those affected by disasters. Payment schedules are set according to statistical data of loss occurrence and mitigate the effects of loss to farmers and others in the value chain from natural disasters and other calamities.

- ✓ ***Forward contracts:*** A forward contract is a sales agreement between two parties to buy/sell an asset at a set price and at a specific point of time in the future, both variables agreed to at the time of sale. Forward contracts allow price hedging of risk and can also be used as collateral for obtaining credit.

- ✓ ***Futures***: Futures are forward contracts (see definition above) that are standardized to be traded in futures exchanges. Standardization facilitates ready trading through commodity exchanges. Futures provide price hedging, allowing trade companies to offset price risk of forward purchases with counterbalancing of futures sales.

2.2.5.5.Financial enhancements

- ✓ ***Securitization instruments***: Cash-flow producing financial assets are pooled and repackaged into securities that are sold to investors. This provides financing that might not be available to smaller or shorter-term assets and includes instruments such as collateralized debt obligations, while reducing the cost of financing on medium and longer term assets.

- ✓ ***Loan guarantees***: Agricultural loan guarantees are offered by 3rd parties (private or public) to enhance the attractiveness of finance by reducing lending risks. Guarantees are normally used in conjunction with other financial instruments, and can be offered by private or public sources to support increased lending to the agricultural sector.

- ✓ ***Joint venture finance***: Joint venture finance is a form of shared owner equity finance between finance private and/or public partners or shareholders. Joint venture finance creates opportunities for shared ownership, returns and risks, partners often have complementary technical, natural, financial and market access resources.

2.2.6. Business Models In Agricultural Value Chains

In agriculture value chain approach, a business modelis the wayby which a business creates and captures value within a market network of producers, suppliers and consumers, or, in short, "what a company does and how it makes money from doing it" (Bill Vorley, Mark Lundy and James MacGregor, 2008).

The business model concept is linked to business strategy (the process of business model design) and business operations. If value chain finance is to be successful, the value chain must be viewed as a single structure, with the model of this structure providing a framework for further analysis.

Calvin Miller and Linda Jones define 4 typical agriculture value chain models summarized in in Table 2.3.The models are characterized by the main driver of the VC and the rationale for promoting the chain(Calvin Miller and Linda Jones,2010).

Table 2.3.:Typical organizational models of smallholder agricultural production indeveloping countries

Model	Driver of organization	Rationale
Producer-driven (association)	Small-scale, especially when formed into groups such as associations or cooperatives Large-scale farmers	Access new markets Obtain higher market price Stabilize and secure market position
Buyer-driven	Processors Exporters Retailers Traders, wholesalers and other traditional market actors	Assure supply Increase supply volumes Supply more discerning customers – meeting market niches and interests
Facilitator-driven	Non-governmental organizations and other support agencies National and local governments	Make markets work for the poor Regional and local development
Integrated	Lead firms Supermarkets Multinationals	New and higher-value markets Low prices for good quality Market monopolies

Source: Calvin Miller and Linda Jones,2010

2.2.6.1 .Producer- driven Model: Producer associations become the driver for value chain development, providing technical assistance, marketing, inputs and linkages to finance. Producer-driven models are driven from the bottom end of the chain. They can be successful but face two major difficulties. First, producers may not understandthe market needs as well as those in the chain who are closer to the end user. Secondly, producers often struggle for financing unless they can find strong partners and/or can get assistance for financing and fore-linking to reliable and competitive markets and partners.

2.2.6.2.Buyer- driven Model: Contract farming is the most common buyer-driven value chain model, where a large processor, exporter or retailer provides buyer credit. The contract (formal or informal farming agreement) may involve advancing inputs, funds and/or technical support, or it might be limited to product sales conditions, such as prices, quantities and delivery dates (Winn et al., 2009). Contract farming often involves stricter terms that specify the type of production, quality, quantity and timing of agricultural product delivery.

2.2.6.3.Facilitator-driven Model: Government agencies and development organizations with a social mission provide external support to facilitate the financing and integration of small famers and agro-enterprises into commercial value chains and make markets work for the poor.

2.2.6.4.Integrated Business Model*:*Integrated value chain model is not only connects producers to others in the chain – input suppliers, intermediaries,processors, retailers and service providers including finance, but it integratesmany of these through ownership and/or formal contractual relationships. Integrated model involves vertical integration within the value chain. Integration is normally sought by a large retailer or wholesaler/importer that is focused on consumer demand, and wishes to ensure that inputs, production and post-harvest handling will result in products that are responsive to that demand.

2.2.7. Constraints of access to agricultural credit in the AVC

Modernizing agriculture requires large infusion of credit to finance the use of purchased inputs such as fertilizers, improved seeds, insecticides, additional labour and so on. In this regard, the provision of agricultural credit can be a powerful economic force for development if used to inject appropriate capital for the purchase of agricultural inputs that are not otherwise available to farmers from their own financial, physical and labour resources. To date, however, institutional supply of agricultural credit remains inadequate; and this continues to impede the transfer of technology and investment into agriculture (Olagunju and Ajiboye, 2010). Agriculture finance supply then remains constrained by various factors. Miller(2008) identified 12 agricultural finance constraints under four headings:

- **Vulnerability Constraints** (Systemic risk, Market risk, Credit / financial risks),
- **Operational Constraints** (Low investment returns, Low investment and asset levels, Low geographical dispersions),
- **Capacity Constraints**,(Infrastructural capacity, Technical capacity and training, Social exclusion, Institutional competency) and
- **Political and Regulatory Constraints** (Political and social interference, and Regulatory framework).

Aderaw Gashayie and Dr Manjit Singh,(2015) summarized agricultural finance constraints and related specific issues in the table2.4.

Table 2.4.: Agricultural finance constraits and related specific issues

Constraints	Issues
I. Vulnerability constraints : 1. Systemic risk 2. Market risk 3. Credit / financial risks	✓ Weather ✓ Plagues, diseases ✓ Prices ✓ Production ✓ Useable collateral ✓ Demand preferences ✓ Health & family needs
II. Operational constraints due to : 4. Low investment returns 5. Low investment and asset levels 6. Low geographical dispersions	✓ Low growth potential ✓ Low velocity of capital ✓ Non-competitive technologies ✓ Lack of market integration ✓ Lack or quality of roads and communication ✓ Low efficiencies of business operations ✓ High operating costs
III. Capacity constraints including : 7. Infrastructural capacity 8. Technical capacity and training 9. Social exclusion 10. Institutional competency	✓ Lack of business investment ✓ Lack of competitive technologies ✓ Lack of roads ✓ Lack of communication ✓ Lack of education ✓ Lack of technical and management skills ✓ Lack of institutional capacity ✓ Lack of social representation (civil society)
IV. Political and regulatoryconstraints : 11. Political and social interference 12. Regulatory framework	✓ Political interference ✓ NGO "donation" interference ✓ Cultural and gender constraints ✓ Land tenure laws ✓ Financial regulations ✓ Tax policy

Source: Aderaw Gashayie and Dr Manjit Singh, 2015

2.2.8. Influence of Agricultural value chain financing on sustainable rural livelihoods

Agriculture plays a critical role in the economies of poor countries, it is also a major employer of rural labor in developing countries, often providing wage income to those who do not have any land or enough of their own to cultivate (IFAD2009). As a livelihood, agriculture is a source of livelihoods for an estimated 86 per-cent of rural people. It provides jobs for 1.3 billion smallholders and landless workers, "farm-financed social welfare"when there are urban shocks, and a foundation for viable rural communities. Of the developing world's 5.5 billion people, 3 billion live in rural areas, nearly half of humanity. Of these rural inhabitants an estimated 2.5 billion are in households involved in agriculture, and 1.5 billion are in smallholder households (World Bank, Agriculture for Development,World development report 2008).

Therefore, the World Bank (1996) opined that credit isnecessary for small-scale farmers to increase theiragricultural productivity and farm income. Modernizing agriculture requires large infusion of credit to finance the use of purchased inputs such as fertilizers, improved seeds, insecticides, additional labour and so on.

In this regard, the provision of agricultural credit through the Agriculture Value Chain can be a powerful economic force development for rural households engaged in farming related activities, if is used to inject appropriate capital for the purchase of agricultural inputs that are available to farmers from their own financial, expand and pay labor for field operations, acquire equipment and establish basic infrastructures for harvest and post-harvest handling activities for the purpose of capturing reliable products markets.By helping them to create agricultural investment that is a major catalyst for job creation, increase productivity by producing higher-quality market demanded products and capture the markets, rural producers obtain fair returns andimprove rural incomes and employment and are able to improve their livelihoods.

2.2.8.1. Concept of Sustainable Rural Livelihoods

Chambers and Conway (1992), the IDS (Institute of Development Studies) team's definition for livelihood is: **"A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living".** Which literally means"Livelihood" is the means, activities, entitlements and assets by which people make a living".

To develop the livelihood of a particular region, following factors or elements should be looked into:Poverty reduction; Creation of working days, Well-being and capabilities (Chambers 1995; Sen 1984; Chambers 1989), Livelihood adaptation, vulnerability and resilience (Davies 1996), Natural resource base sustainability (Conway 1985, Holling1993).

Ellis (1998) defines **"livelihood diversification"** as `the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living. Agriculture provides a source of vitality and social welfare in rural communities that can mitigate urban shocks.

In respect of above insights, as the majority of rural population are living mainly by agriculture activities, for the agriculture to work better and improve the livelihoods of the rural small scale farmers, financial services need to work better along and within Agriculture Value Chains in helping the farmer to enhance productivity and promotes standards of living by breaking vicious cycle of poverty.

Therefore, rural economiesfor developing countries requireadequate AVCF approaches with wide range of diversified financial services and products to make small scale producers capable to meet their short and long-term financial needs along the chain and be able to raise productivity, produce high quality products to meet the markets demands, earn more incomes for their sustainable livelihoods.

2.3. RICE SUB - SECTOR DEVELOPMENT IN RWANDA

2.3.1. Summary background of the introduction of rice commodity in Rwanda

Rice was introduced in Rwanda in 1950s through various missions from China and Korea. After the initial success of growing rice in the valleys near Kigali and in the Southern province, a number of varieties became popular in 1960s. These varieties collectively referred to as Kigoli, are of short and bold type. In Bugarama, government introduced rice varieties from India such as Basmati 370 in 1980s. In 2001-02, the national agricultural research institution, Institut des Sciences Agronomiques du Rwanda (ISAR), in collaboration with West Africa Rice Development Association (WARDA) evaluated a total of 990 rice accessions in farmers' field through a participatory approach in 4 marshland areas. Farmers selected 24 rice varieties based on tillering ability, early maturity, erect flag leaf, panicle length, big and heavy panicles, long and slender grains, awning, general disease occurrence, and grain yield. These varieties were

subsequently introduced for cultivation in different marshland areas in the country in 2002. The new varieties are of long and slender type and generally yield higher than Kigoli varieties. However, the varieties are not as widely adapted as the Kigoli varieties in Rwanda (KATHIRESAN Arumugam,2010).

Currently, rice commodity is among the priority food crop value chains to be developed under MINAGRI CIP Programme: Bananas, wheat, maize, rice, irish potatoes, cassava, soya beans, beans (MINAGRI website, PSTA II, 2009 &PSTA III, 2013).

2.3.2.Rice Farming Systems

Although rice is not a traditional crop, it has emerged as the most suitable crop for marshlandsand inland valleys in the recent years. Several reasons justify this recent shift in cultivation. Soil erosion in the hills and the associated slopes due to intensive cultivation of traditional crops such as banana, cassava, beans and potato has diminished the sustainability of farming in the uplands. Rice is the only crop that thrives well and produces better yield than any other traditional crops especially during rainy season. The recently introduced varieties can yield up to 7t/Ha. Thus, rice provides a viable alternate for millions of resource-poor rural farm families in Rwanda(KATHIRESAN Arumugam,2010).

2.3.3. Marshland Development

Due to the mountainous nature of Rwandan geography, rice is grown mostly in swampy inland valleys that are referred to as marshlands. The top soil in marshlands is more heterogeneous and constantly changing. This is due to the various degrees of erosion of soil from the associated hills into the marshlands. Under marshlands, rice is grown in puddled soil in two seasons a year. During the wet season (January through June), the soil is constantly moist due to rains and the occasional flooding. In 2009, rice was grown in about 12,000 Ha of marshlands. Although water is increasingly becoming a constraint during the dry season, some marshlands in the country are comparable to the favourable lowland rain fed environment(KATHIRESAN Arumugam,2010).

2.3.4. Chain actors

The commodity chain for domestic rice starts with the **rice farmers** who produce the paddy. Farmers are responsible for drying, cleaning and packaging the paddy produced from their individual farms.

After winnowing and packaging, the farmers bring their paddy to their respective **cooperatives** in which he/she holds a membership. Some, but not all, cooperatives have shareholdings (40%) in the rice mill located near their production areas. It is a norm in new rice mills (Kirehe Rice Company Ltd in Kirehe District, for example) that were constructed and sold to private sector by the government under 'build and transfer' model. In such cases, the cooperatives have the obligation to negotiate thetrading of paddy with their partly owned mills. In some other cases, paddy from one or more cooperatives is collectively sold by the **union of cooperatives**. Either the cooperatives or the unionscollectively sell the raw paddy produced from their respective marshlands.

Hence only raw paddy is supplied to **rice millers**. Almost all of the rice mills are modernized and have capacities of processing >3.0 tons of paddy/hr. The mills process the paddy into milled rice through a series of de-stoning, de-husking and polishing actions. Thus the millers add a major value to the paddy grains.

Besides the locally produced rice, markets in Rwanda also source substantial amounts (48.2%) of thedomestic consumption requirements from other rice growing countries. Thus **rice importers** play a key role in the country's rice commodity chain. Both imported rice and locally processed rice are collected by **distributors**. Through a business relationship with the millers and/or exporters located in other rice producing countries, the distributors purchase, stock and sell rice to prospective **wholesalers** and/or **retailers**. Wholesalers generally buy a large quantity of milled rice from distributors. It is through this high volume purchase, the wholesalers distinguish themselves from retailers. Retailers on the other hand often purchase smaller quantities and sell to **customers** through a relatively larger for margin/profit business channels in a price competitive market(KATHIRESAN, Arumugam, 2013).

2.3.5. Chain supporters

GoR has been proactively supporting the development of local paddy through **MINAGRI CIPProgramme** which involves expansion of land area under rice cultivation in land consolidation model in marshlands and raising productivity of rice crop by subsiding quality seeds and fertilizers.Through CIP, MINAGRI addresses various issues along the rice value chain. By bringing various chain actors, CIP facilitates accessibility to markets (both input and outputs).**Rwanda Standards Board (RSB)** plays an important role in implementing policies related to rice processing industry. RSB is responsible for adherence of general standards of premises, machineries,safety regulations for staff and environment, hygiene, and labeling

requirements of finished products(milled rice, rice flour). RSB also play a supervisory role in ensuring the quality (grades and purities) of imported and locally processed rice.

MINICOM sets overall trading regulations for rice commodity in the country. While MINICOM guides the stakeholders in reaching a consensus on farm gate prices; the prices for milled rice (local and imported) are set by the market forces. MINICOM also coordinates the alignment of national policies on rice markets with EAC's regional policies in order to mainstream the macroeconomic interests of the country. It oversees the implementation of government policies on in rice trade encompassing imports, exports and local markets (KATHIRESAN Arumugam, 2013).

2.3.6. Case study: COOPRIKI- CYUNUZI

"COOPRIKI-CYUNUZI" in abbreviation is called" **Coopérative des Riziculteurs de Kibaya-Cyunuzi**", a cooperative of rice growers located in the Kirehe District of the Eastern Province of Rwanda. COOPRIKI-CYUNUZI counts 2,856 members organized into small groups of farmers who grow rice in the marshlsnds of Kibaya and Cyunuzi ,in Gatore sector, Kirehe District crossed by the Kigali - Rusumo road, in Gatore sector of Kirehe district.

COOPRIKI-CYUNUZI collects the paddy produced by the cooperative's members and sells it to Kirehe Rice Milling Plant and to other markets.

COOPRIKI-CYUNUZI works in Value Chain Model. That has motivated the researcher to choose the cooperative to serve as a case study of this research work which seeks to illustrate the impact of the Agriculture Value Chain Financing Approach on small farmers 'livelihoods. Further details on the cooperative will be presented in Chapters Three and Four.

2.4. AVCF KNOWLEDGE GAP ANALYSIS

Chapter Two introduces the "**Agriculture Value Chain Finance"** approach in terms of its theoretical background. In this Chapter, different authors such as: Calvin Miller(2012), Calvin Miller and Linda Jones(2010), Da Silva(2007), Bill Vorley, Mark Lundy and James MacGregor(2008), Aderaw Gashayie and Dr Manjit Singh(2015), all of them presented the AVCF as an approach to finance by identifying AVCF's financing needs, the financing gaps and corresponding AVCF's financial instruments and business models, the constraints to access

finance, who can support actors to access finance, who can provide the financing, and what are the ways to improve access to financial services, etc.

In this Chapter Two also, many other authors such as: Chambers and Conway (1989, 1992,1995), Sen (1984); Davies (1996), Conway (1985), Holling (1993), Ellis (1998) as well as the World Bank, all provided insights on the concepts of "Sustainable Rural Livelihoods" and "Livelihood Diversification".

In addition to that, to explore more theliterature review, the researcher conducted a desk review of main existing documentation on agriculture policies as well on the Rwanda rice sub-sector, such as: MINAGRI website's documents and policies, PSTA II(2009) & PSTA III(2013), "Rwanda Rice Report, Enabling Self Sufficiency and Competitiveness of Rwanda Rice" and "Rwanda's Rice Commodity Chain", KATHIRESAN Arumugam (2010, 2013).

However, the researcher has never found any existing research or documentation telling about how existing financial facilities in Rwanda have impacted the livelihoods of smallholder farmers and what challenges that smallholder farmers are encountering in credit acquisition, especially in Rwanda rice sub-sector. That is the main knowledge gap in the literature review explored in this AVCF research.

To fill this knowledgegap through COOPRIKI-CYUNUZI case study, the researcher will attempt to identify:(i) financial facilities that have been provided to the cooperative's members during chain activities on a certain period of study, (ii) what constraints that farmers are facing in accessing loans from FIs, and (iii) how the financing received have impacted the livelihoods of rice growers working together in COOPRIKI-CYUNUZI.

2.5. CONCLUSION

The literature review on AVCF in Chapter Two covered main concepts on "AVCF", "Rural Livelihoods" and "Rwanda Rice sub-sector". This chapter will serve as reference for developing the remaining chapters Three, Four and Five of this research in order to provide a practical application of the AVCF to the case study: COOPRIKI-CYUNUZI Rice cooperative, as well as for filling the knowledge gap analysis of the main subjects of this study: "AVCF" and "Sustainable Rural Livelihoods".

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. INTRODUCTION

Chapter Three discusses mainly on: (i)the study area, source of data, methods, techniques and tools, of the "Research Methodology" that were used for data collection, (ii) targeted population, sample and samplingtechnique used,(iii)techniques used for data analysis andresults'interpretation and presentation.

The study mainly focuses on Rwanda rice value chain financing with the typical case of COOPRIKI-CYUNUZIcooperative which is a cooperative of rice growers based in Kirehe District of the Eastern Province of Rwanda.

3.2. RESEARCH DESIGN

3.2.1.Study Area

This study was carried out in COOPRIKI-CYUNUZI:"**Coopérative des Riziculteurs de Kibaya- Cyunuzi**"located in Kirehe District of the Eastern Province of Rwanda.

Cooperative's members are growing rice paddy in the marshlands of Kibaya and Cyunuzi that cover about 618 hectares in two districts of Ngoma and Kirehe of the Rwanda Eastern province. Members are organized in 16zones, namely: Rwabutazi1,Rwabutazi 2, Sagatare1, Sagatare 2, Kabirizi1, Kabirizi2, Rukizi1, Rukizi2, Rukizi3, Nyamugali1, Nyamugali 2, Nyagateme, Cyunuzi1, Cyunuzi2, Nyaruvumu1 and Nyaruvumu 2. In each zone, farmers are further organized in groups depending on the size of the zone.

3.2.2. Sources of data

As far as this study was concerned, the researcher collected both primary and secondary data. Primary data was gathered by collecting data through questionnaires distributed to key informants: COOPRIKI-CYUNUZI Management Team, lead farmers, selected farmers, staff of supporting agencies and banks 'officials, both have been working closely with the cooperative.

With regard to secondary data collection, the researcher conducted a desk review of existing documentation and literature on Rwanda Rice Value chain, such Rwanda Rice Policy Report, Rwanda Rice Commodity Chain Report, Rwanda Rural and Agriculture Financial Service Strategy, PSTA II&III, USADF Technical and Market Analysis Reports on COOPRIKI-CYUNUZI, etc, to complement the primary data. The desk review through agriculture policies

and strategic documents were undertaken first to gain a wide understanding of the Agriculture sector development, and most specifically, on the rice sub-sector development in Rwanda.

3.2.3. Research methods used

Two research methods: "descriptive qualitative" and "correlational analysis" methods have been combined in this research study: Edvantia SBR Rating for Technical Assistance Programs and Services form (2007) and Carter McNamara Overview of Methods to Collect Information handout (1998) provided definitions of these research methods:

- Descriptive qualitative method describes things as they are. It is a detailed description of specific situation(s) using interviews, observations, document review. This method was used by collecting secondary data and conducting a document review of existing reports, books, policies, on agriculture financing in Rwanda and Rwanda Rice-sub sector to know the status of level and types of financing received in COOPRIKI-CYUNUZI.

- Correlational analysis method is a quantitative analysis of the strength of relationships between two or more variables. This method was used by collecting primary data through a questionnaire that was distributed to selected respondents. A "correlational analysis" between dependent and independent variables was done using the SPSS (Statistical Package for the Social Sciences) software to understand the relationship between AVCF in COOPRIKI-CYUNUZI and livelihoods of the cooperative's members (rice growers). Correlation quantifies the extent to which two quantitative variables, Xand Y "go together." When high values of X are associated with high values of Y, a positive correlation exists. When high values of X are associated with low values of Y, a negative correlation exists(http://www.sjsu.edu/faculty/gerstman/StatPrimer).

3.2.4.Data collection techniques used

In this study, both primary and secondary data were used in order to complement each other. The quantitative primary information was collected through questionnaires distributed to COOPRIKI-CYUNUZI Management Team, lead farmers and cooperative's selected members and other support agencies 'staff.

Questionnaires are a good way to obtain information from a large number of people and/or people who may not have the time to attend an interview or take part in experiments. They

enable people to take their time, think about it and come back to the questionnaire later. Participants can state their views or feelings privately without worrying about the possible reaction of the researcher. Questionnaires typically may contain multiple choice questions, attitude scales, closed questions and open-ended questions.

The researcher developed a structured questionnaire with mixt open and closed questions, and it was administered to different respondents before each meeting with respondents.

Meetings with respondents for data collection were organized at COOPRIKI-CYUNUZI head office in Gatore sector for the Management Team, lead farmers and selected cooperative's members selected were meet respectively at three main sites, namely at Cyunuzi, Nyaruvumu and Rukizi. The people from FIs working with the cooperative, as well as form MINAGRI's agencies (KWAMP) and USADF-Rwanda were meet at their respective work places.

Before the beginning of each meeting conducted with respondents, they were informed about the research's purpose, the questionnaire and related questions were shown and explained. Respondents were also informed that they were allowed to not answer a question for which they do not feel comfortable to answer. High confidentiality was guaranteed, particularly for information that may directly lead to the identification of a respondent to be revealed to the public.

3.3. POPULATION AND SAMPLE SELECTION

Donald Ary, Lucy Cheser Jacobs, and Asghar Razavieh(1972) defined the "Population"and "Sampling" in these terms:

- "A population consists of all the subjects you want to study. A population comprises all the possible cases (persons, objects, events) that constitute a known whole".

- "Sampling is the process of selecting a group of subjects for a study in such a way that the individuals represent the larger group from which they were selected. This representative portion of a population is called a sample".

In light of the above definitions, a sample is any number of things, people or events less than the total population which is selected for inclusion in the study. The results obtained from this

sample are considered to be the same as those that would have been obtained if the case study had been administered to the total population.

3.3.1. Targeted population and Sample size

Under this study, the targeted population was the 2.856 small holder farmers growing the rice paddy in Kibaya and Cyunuzi marshlands, and members of COOPRIKI-CYUNUZI rice cooperative based in Gatore sector, Kirehe district of the Eastern Province of Rwanda.

The sample size was 50 selected respondents from that population of 2.856 rice growers comprised of COOPRIKI-CYUNUZI,Management Team, lead farmers and other selected ccooperative's members. Inaddition to them, the researcher met other 5 selected people from FIs and other staff working forCOOPRIKI's supporting agencies (BPR,URWEGO OPPORTUNITY BANK, SACCO GATORE, and KWAMP) who have been working closely with the cooperative on access to finance related matters. The total number of selected people to respond to the questionnaire was 55 respondents.

3.3.2. Sampling technique used

The "Convenience Sampling"method has been in this study. "Convenience Sampling" is is a type of non-probability sampling technique use to select cases based on their convenient availability for the study.The researcher used this sampling technique because she was constrained by time, money, temporal and spatial distribution of the mother population.

3.4. DATA ANALYSIS

3.4.1. Data analysisand presentation process

After conducting the questionnaire distribution, qualitative data(answers) collected were first coded and then categorized around pre-defined "themes" developed around the main research's questions.

Coding is the process of organizing and sorting your data.It involves grouping questionnaires' responses into categories that bring together the similar ideas, concepts, or themes that have been discovered. By coding answers and grouping them under different topics and headlines, a possible relationship can be indicated, the outcomes can be easier evaluated and analyzed and conclusion can be drawn by comparing the results without losing the overview.Codes serve as a way to label, compile and organize your data. They also allow you to summarize and synthetize

what is happening in your data. In linking data collection and interpreting the data, coding becomes the basis for developing the analysis.

Once data were classified under different categories, a thematic analysis was done. According to Braun and Clarke (2006), a thematic analysis is a qualitative analytic method for 'identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes your data set in rich detail. However, frequently it goes further than this, and interprets various aspects of the research topic.

Braun and Clarke (2006) also says that a theme captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set. To conduct a thematic analysis in this study, stages suggested by Braun and Clarke (2006) were followed. The first concern was to get familiar with the data; secondly initial codes were generated, thirdly searching for themes, fourthly reviewing themes, fifthly defining and naming themes and lastly producing part of the report on qualitative data analysis.

Firstly, main characteristics of respondents (gender, class of age, educational level, maritial status,..)were defined and presented.Then, a technical analysis was conducted and focused on thematic factors' answers provided by respondents which responds the main research questions:

- *Are the existing alternative financial mechanisms, risk mitigation products and economic models for Value chain Finance approach work efficiently to raise the productivity and income growth for smallholder farmers?*

- *Which constraints are limiting smallholder farmers' accessing finance in Agricultural Value Chain model,and what can be done by stakeholders to overcome those constraints?*

- *How AVCF can impact the livelihoods of smallholderfarmers and what should be the roles of different stakeholders in promoting this approach?*

Then, the technical analysis of the main thematic responses enabled the researcher interpreting the results for each thematic topic and drawing conclusions in relation to the research questions.

3.5. CONCLUSION

This chapter described the research methodology used comprised of research area, source of data,research methods and techniques used for data collection, the population and sample, data analysis and interpretation.

The researcher used bothdescriptive qualitative and correlational analysis methods; a questionnaire was administered by the researcher herself to collect the data from a convenient sample of 50 respondents. The questionnaire had both closed and open-ended questions. The sample characteristics included rice growers who were willing to participate in data collection process.

Permission was obtained from COOPRIKI-CYUNUZI Management Team. Consent was obtained from the respondents themselves. Anonymity, self-determination and confidentiality were ensured during administration of the questionnaires and report writing. Questionnaires were distributed to the respondents to ensure validity.

Chapter Four will in deep details, analyze,present data collected and interprete the results.

CHAPTER FOUR: RESEARCH FINDINGS

4.1. INTRODUCTION

The purpose of this chapter is to presentand analyze data collected from different documentations and questionnaires distributed to selected respondents, as well as to interpret the results of the study.

The researcher reviewed different documentations produced on Rice Value Chain in Rwanda, specifically on COPRIKI-CYUNUZI cooperative, such as,Rwanda Rice Policy Report, Rwanda Rice Commodity Report, support documents from stakeholders which supported COOPRIKI-CYUNUZI, such,the Technical and Market Analysis Report produced by USADF Rwanda on COOPRIKI-CYUNUZI, the cooperative's financial and activity reports, reports from KWAMP and RSSP, the two agriculture development projects based in MINAGRI which provided both technical and financial support to the cooperative, etc.

In addition, the researcherused a questionnaire to collect data information from selected cooperative's members. She also met technical staff from RSSP and KWAMP, USADF's staff, officials fromBanque Populaire, Urwego Opportunity Bank and SACCO Gatore. All of them have been identified as key people whoprovided different forms of support (financial or technical) toCOPRIKI-CYUNUZI.

Primary and secondary data have been analyzed using Codification and Thematic Analysis approaches to explain qualitatively changes that happened in the livelihoods ofcooperative 'membersas recorded over the study period.

This chapter presents the profile of COPRIKI-CYUNUZI and its major supporting organizations. Then, it will present the organization of data collected, data analysis and results interpretation.

Finally, findings of this research will lead to the researcher's own recommendations to different stakeholders involved in Agriculture Value Chain development.

4.2. PROFILE OF COPRIKI-CYUNUZI

4.2.1. Location, Creation and mission

The Cooperative of rice growers, "**COOPRIKI-CYUNUZI**" in abbreviation called: **"Coopérativedes Riziculteurs de Kibaya-Cyunuzi"**,is located in Cyunuzi village, Gatore sector, Kirehe District, Eastern Province of Rwanda. The cooperative is made up by 2.856 members (1765males and 1091 females), members are engaged in ricefarming and commercialisation activities. Currently, COOPRIKI-CYUNUZI operates in the marshlands of Kibaya and Cyunzi that cover about 618 hectares in two districts, Ngoma and Kirehe of the Eastern province of Rwanda. Members are organized in 16 zones, namely: Rwabutazi1,Rwabutazi2, Sagatare1, Sagatare 2, Kabirizi1, Kabirizi2, Rukizi1, Rukizi2, Rukizi3,Nyamugali1, Nyamugali 2, Nyagateme, Cyunuzi1, Cyunuzi2, Nyaruvumu1 and Nyaruvumu 2.In each, zone farmers are further organized in small groups depending on the size of the zone.

The cooperative started its activities in 2005; it got its official registration later in 2006 and they received a new certificate in 2009 in order to comply with the new cooperatives law.

The purpose of COOPRIKI-CYUNUZI is to promote the interest of the rice farmers by mobilizing them to join efforts in finding solutions to challenges of poverty and middle men buyers who buy their paddy at a low price. The cooperative has to ensure that the entire paddy produced in the area is channeled through the cooperative for better prices. The cooperative facilitates also acquisition of other services related to production and marketing that are available at COOPRIKI-CYUNUZI. In summary, the cooperative provides the following services to its members:

- Organize and facilitate finance to farmers during land preparation
- Supervise water distribution among farmers' plots to proper irrigation
- Purchase and distribute recommended seeds and fertilizers from the recognized government inputs, as well as organize loan payback at harvest time
- Fetch paddy brought by farmers at collection centers and ensure its transportation to the main collection center
- Organize marketing of the paddy collected from members to different markets and bargain prices on behalf of famers
- Safeguard the interests of rice farmers in Kibaya and Cyunuzi marshlands through advocacy and other negotiations regarding marshlands, water distribution and other challenges
- Represent famers in different forums regarding rice farming business

(primary and secondary data)

4.2.2. COOPRIKI-CYUNUZI Governing Structure

The governance structure of COOPRIKI - CYUNUZI falls under the Rwanda laws governing cooperatives in Rwanda. The governance structure is made up of the General Assembly, Board of Directors, Executive Committee, and Supervisory/Audit Committee:

a. **The General Assembly:** General Assembly is made up of all Cooperative members and is the supreme governing organ of the cooperative, responsible for setting policies and regulations that govern the Cooperative. The General Assembly elects the Board of Directors composed of 9 members. The Board is responsible for ensuring that the decisions and policies of the General assembly are implemented. Other Governance organs of the Cooperative are the Executive Committee and the Supervisory Committee as explains below:

b. **The Board of Directors:** The Board of Directors is made up of 9 members elected by the General Assembly. The Board is responsible for ensuring that policies, regulations and guidelines for the General Assembly are properly implemented. Also the Board has the responsibility to oversee all the management issues of the cooperative. The Board is elected to serve for an initial term of 3 years which is renewable only once.

c. **The Executive Committee:** The executive committee is elected by the Board and it is elected among the Board members. Executive Committee is made up of 3 people, the President, Vice President, and Secretary. The Committee oversees day to day implementation, supervises the Management staff and liaises with other actors on behalf of the cooperative.

d. **The Supervisory /Audit Committee:** This committee is made up of 3 persons elected directly by the GA to serve for an initial term of 2 years which is renewable only once. At least 2 members of the committee must be representative from the ordinary Cooperative members. The work of the Supervisory Committee is to supervise the general running of the cooperative. The committee also carries out audits and makes reports for the GA. The cooperative arranges in such a way that the mandate of the

Supervisory Committee cannot expire at the same time as that of the Executive Committee.(primary data, COOPRIKI Management)

4.2.3. Process of paddy production, Harvest, Post-Harvestand marketing in COOPRIKI–CYUNUZI

Initially the farmers grew paddy of Youn Youn variety on a small scale of about 150 hectares. In 2005, the number of hectares were increased to 350 under the support of RSSP1 with a productivity of 6 MT/ha. In 2010, the area under paddy production increased to the current 618 hectares with a productivity of 6,5 MT/ha for Youn Youn variety. The cooperative has recently introduced the Watt 320 variety on a small scale of 50 hectares. It is planned that, by 2015 Watt variety will have completely replaced the Youn Youn one. Watt 320 is highly demanded in the market due to its aroma and fetches better prices than Youn Youn ((USADF- Rwanda 2012, CYUNUZI Technical and Market Analysis Report).

The following activities are carried out by cooperative's members during paddy production process, with the guidance and facilitation of COOPRIKI Management(primary data,COOPRIKI Management):

4.2.3.1.Paddy Production Process

i. **Nursery establishment and maintenance:**The seeds are facilitated to germinate quickly before transplanting into the field; this is achieved by application of urea fertilizer.

ii. Field operations:

- ✓ **First plowing:**Immediately after harvesting paddy of the previous season, the soil is broken down as the soil previously had been dried to allow the rice grains to mature fast for harvesting.

- ✓ **Second Plowing:**After 1 week, second plowing (harrowing) follows. Immediately after harrowing, water canals are opened to allow in a lot of water.

- ✓ **Puddling:**This is thoroughly mixing the soil with water, making a homogeneous mixture of soil and water.

- ✓ **Addition of NPK fertilizer:** The cooperative's members use the recommended rate of 200kg/hectare of NPK (17:17:17). Before the NPK is added, the soil is dried for just one day in order to prevent fertilizer leaching. The following day after fertilizer addition, planting the seedlings into the field is done.
- ✓ **Irrigation**: Three days after planting, the water canals are opened into the planted field and water stays for three days after which the canals are closed to drain of water for three days. This alternation of irrigation and dying of the field continues for a period of 15 days after planting.

- ✓ **Weeding:** First weeding is done 15 days after planting. This is the time when 50kg/hectare of Urea fertilizer is added. After another 15 days, the second weeding is done and again 50kg/hectare of urea is added; urea promotes rapid growth and high yield. The third weeding is done after 20 days and at this period the amount of water is increased in order to completely flood the field; this will promote good growth.

- ✓ **Disease and pest control:** The cooperative members were trained in Integrated Pest Management (IPM). They do not use chemicals. Instead, they use crop hygiene by weeding at the right ; it time reduces the incidence of pests like Diopsisthoracica. Sterilizing the seed when preparing the seedlings in the nursery reduces also the incidences of seed borne fungal and bacterial diseases such as Pyriculeriaoryezae. However, the cooperative stocks some chemicals (fungicides and insecticides) that are used at a minimum, especially in case the attack/incidence justifies the use of chemicals. The chemicals that are normally used are dimethoate (insecticide) and benomil / Benlate (fungicide).

iii. **Bird Guarding:** 140 days after planting, rice fields are susceptible to bird's damage because the rice developing seeds are still soft full of milky food reserves. Therefore, the birds are guarded for at least 45 days. However, as the seeds become harder and drier, the risk of the bird damage is reduced. The most vulnerable time for the bird damage is between 6.00am. and 10.00am and again between 3.00pm and 6.00pm. At COOPRIKI –CYUNUZI, women and men alternate to guard the birds, especially during working days of the week as most of their children are at school.Alternatively, the can hire temporely guards.

4.2.3.2.Harvest and Post-Harvest Handling activities

(i) Harvesting: In COOPRIKI-CYUNUZI, it takes 6 months after planting to harvesting time. Harvesting is done by cutting the plants using a sickle.

(ii) **Threshing:** Threshing is done manually by hitting the rice panicles on an object. Some cooperative's members use threshing machines.

(iii)**Post-Harvest handling:** After threshing, the paddy is dried on 20 drying yards that are scattered in some of the16 zones in which the cooperative operates. COOPRIKI-CYUNUZI lacks enough drying facilities. The20 drying yards are not enough considering the total area of 618 hectares of marshlands under paddy production, and these drying yards are unevenly distributed, Few cooperative members use tarpaulins for drying their paddy, thus many have a big problem in drying their paddy. With the loan provided by Banque Populaire du Rwanda, Ltd and a grant provided by KWAMP Project, COOPRIKI-CYUNUZI will be able to establishin total (3)new drying yards and (3) new warehouses at the cooperative's sites.The paddy is then packaged into bags of 100kgs.

(iv)**Collection process :** Each zone in COOPRIKI-CYUNUZI has four collection centers where individual members will deliver his/her paddy. There is a storage facility at each collection center in which paddy will be received and temporality stored before it is taken to the main store at the cooperative premises. At the collection centers,the paddy collected from members is tasted for dryness, weighted and units will be recorded on the member's card after all deductions for the services rendered such as fertilizer cost and contribution for land maintenance. Then, the cooperative withdraws funds and the cooperative's accountant pays farmers on delivery of their paddy at the collection centers. The cooperativeis in charge of transporting the paddy from various collection centers to the main coop warehouse where traders come and collect the paddy.Some collection centers are located at long distances more than 25km away from the main collection/selling center.

4.2.3.3.Paddy marketing and selling

COOPRIKI-CYUNUZI is involved inpaddy value addition to increase its sales through selling milled rice at profit.The cooperative buys and collects the paddy from its members, 100%

upfront at collection sites. Then, the paddy is transported it to the nearby run factory(Kirehe Rice Milling Company) where the cooperative pays for the paddy milling. Finally, the cooperative collects the milled rice back from the factory and sells it to traders who come and buy rice from the COOPRIKI-CYUNUZI's main warehouse in Gatore sector and take it to their respective markets. COOPRIKI-CYUNUZIsuppliesother different marketssuch schools, hospitals, hotels, etc, on bidding process.

4.3. COOPRIKI' S MAJOR SUPPORTING ORGANIZATIONS IN LAST FIVE YEARS

4.3.1. Rural Sector Support Project (RSSP)

The Rural Sector Support Program (RSSP) is within the Ministry of Agriculture and Animal Resources (MINAGRI). Its objective is to ensure reduced poverty in rural areas through increased agricultural production and incomes. The project is funded by the World Bank through a three-phase adaptable program loan (APL) to be implemented in 15 years. The first phase (RSSP1) became effective in 2001(2001-2007), while the second phase (RSSP2) became effective in 2008(2008-2012). The third phase(RSSP3)is stillongoing (2013-2018) (www.minagri.gov.rw).

RSSP focuses on two(2) main interventions which are:

(i) **Marshlands and Hillsides development/rehabilitation:**The project rehabilitates marshland to enable farmers in subsistence farming of low value crops in these marshes start growing high value crops throughout the year. This is through construction of dams and irrigation canals that facilitates irrigation in the dry season and floods control in the rain season.

(ii) **Strengthening Commodity Chains:** The project supports farmers' organization all over the country to ensure that there are professional Cooperatives in agriculture. Intensive capacity program for farmer groups in production, postharvest, marketing and value addition that were carried out by the project have had good results.

During its second phase, from 2008 to 2010, RSSP 2 provided a financial support in form of a grant worth 131,922,940 Frw to COOPRIKI-CYUNUZI that was intended to help the cooperative the construction of 12 drying yards and onewarehouse facility(USADF- Rwanda 2012, COOPRIKI-CYUNUZI's Technical and Market Analysis Report).

4.3.2. Kirehe Community Based Watershed Management Project (KWAMP)

The Kirehe Community-based Watershed Management Project (KWAMP) operates in Kirehe District since 2009, is an agricultural investment project implemented by MINAGRI and co-financed by IFAD and the Government of Rwanda. It became effective on 30th April 2009, and is due for completion in June 2016. Its overall objective is the development of sustainable profitable small-scale commercial agriculture in Kirehe District (www.minagri.gov.rw).
KWAMP project has a Grant Programme called "**Value Chain Development Fund (VCDF)"**which supports Kirehe-based producers' integration into markets by facilitating the establishment of infrastructures and acquisition of equipment that help them to add value to their commodities.

The purpose of the grant facility is to (i)promote commodity value-chain development in Kirehe District by supporting producers' integration into markets, and(ii) increase volumes and value of commodities in Kirehe District by facilitating the establishment of inputs and outputs bulking systems (for storages upgrade or construction, storage management and operations, such as drying, grading and processing practices).

Through a co-financing scheme (in 2016) with Banque Populaire which provided a loan worth 72.000.000 Frw to the cooperative, KWAMP also provided to COOPRIKI-CYUNUZI a complementary grant support worth 100.000 USD (approximatevely 75.000.000 Frw) underthe Value Chain Development Grant Programme (VCDF).The purpose of this co-financed investment project is to establish Post-Harvest infrastructures on three sites, of COOPRIKI-CYUNUZI, namely: Cyunuzi, Nyaruvumu and Rukizi.At each site, a mid-size warehouse and a drying area will constructed, helping rice growers to handle the first harvest operations in a proper way, before the paddy can be collected and sold to different markets(KWAMP, primary and secondary data).

4.3.3. United States Agriculture Development Foundation (USADF) –Rwanda

USADF's current program in Rwanda was re-established in 2006 after leaving during the genocide. USADF's focus is to enabling farmer cooperatives and associations to expand production and value-added processing and enlarge their memberships particularly in the tea, rice, pineapple, potato and cassava sectors of agriculture. USADF grants aim to increase household incomes and food security for group members many of whom are widows and orphans, people living with HIV/AIDS, returnees or repatriates, and the elderly. It works

directly with these rural farmer organizations to improve agricultural production on limited land resources and engage in processing activities to bring higher prices for their products.

With regard to COOPRIKI-CYUNUZI, USADF has committed a total working capital in form of a grant worth 145,076,097 Frw for paddy purchase. Those funds are intended to help the cooperative expanding production; USADF's funds will be released in installments, as the cooperative fulfills requirements(USAD Rwanda 2012, COOPRIKI grant doc.).

4.3.4. Financial Institutions

A part from the different financial supports received from agriculture development programmes, COOPRIKI-CYUNUZI is working with FIs to partly finance some needs arose along the value chain. In the production process, Urwego Opportunity Bank and SACCO Gatore advancemoney to producers for inputs and fertilizers acquisition. This is done through the cooperative, which distributes the funds among members. At harvest, the cooperative deducts fees to each member who sells the paddy to the cooperative. Then, the cooperative collects the loan repayment amount in that way, and pays Urwego Opportunity Bank and the SACCO Gatore.

Despite the drying yards and a warehouse provided by RSSP to the cooperative, COOPRIKI-CYUNUZIstill lacks sufficient Post-Harvest facilities to serve the members during harvest period. The cooperative covers a large area under paddy cultivation (618hectares). It is in that regard that, COOPRIKI-CYUNUZI contracted an investment loan of 72.000.000 Frw with Banque Populaire to establish Post-Harvest facilities at 3 main sites: Cyunuzi, Nyaruvumu and Rukizi. At each site, the cooperative will construct one warehouse and one drying yard, in total 3 mid-size warehouses and 3 drying yards will be established to partly serve farmers in Post-Harvest handling activities. The loan will be complemented by the VCDF/KWAMP grant support of 70.000.000 Frw and cooperative members'contributions worth 132.352.208 Frw. The total project cost is Frw 282.352.208 (KWAMP, primary and secondary data).

4.4. PRESENTATION, INTERPRETATION AND ANALYSIS OF DATA

First, this section shall discuss the characteristics of the respondents. Then, it shall discuss the findings obtained from the instrument used in the study: a questionnaire. Data have been collected and analyzed through a questionnaire developed around specific themes related to the main research questions. The researcher provided tables and graphs that summarize the collective reactions of the respondents.

4.4.1. General characteristics of respondents

The total selected respondents to the questionnaire numbered to fifty (50) comprised of:

(50) cooperative's members (including elected Management, lead farmers and regular members)
(1) technical staff from KWAMP Project
(1) staff from USADF-Rwanda
(3) staff from FIs(one staff from Banque Populaire du Rwanda, one staff from UOB and one from SACCO Gatore).

People selected outside the cooperative to respond to the questionnaire are key-informants who have been working closely with COOPRIKI-CYUNUZI, and therefore, they were expected to provide reliable information on the cooperative.

Table 4.1.: Categories of respondents by institution

Institution	**Number**	**%**
COOPRIKI-CYUNUZI	50	91
FIs	3	5
Dvt Agencies (USADF)	1	2
MINAGRI(KWAMP)	1	2
Total	**55**	**100**

Source: COOPRIKI - CYUNUZI Management, 2015

Respondents from COOPRIKI-CYUNUZIwere representing 91%. Other people who participed in the data collection representing 9% were made by three(3)staff from FIs which provided loans to COOPRIKI's farmersat different stages of the rice paddy production, and two(2) key-staff from support agencies who worked with the cooperative on access to finance issues. They providedtheir views on credit access matters.

4.4.2.Socio-economic characteristics of COOPRIKI's respondents

The table below summarizes general characteristics the 50COOPRIKI-based respondents.

Table 4.2.:Socio-economic characteristics of COOPRIKI's selected respondents

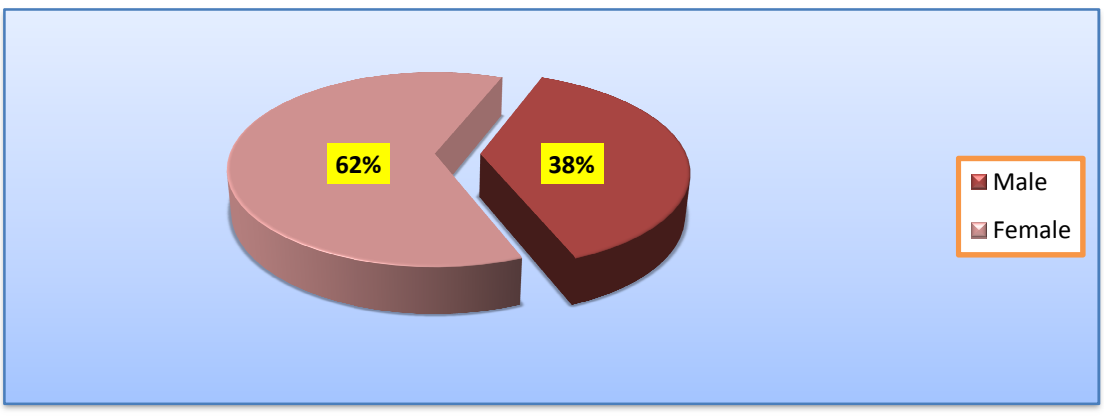
Gender	**Number**	**%**
Male	19	38
Female	31	62
Total	**50**	100
Age class	**Number**	**%**
< 20 years	0	0
20-29 years	8	16
30-39 years	22	44
40-49 years	16	32
50 years and above	4	8
Total	**50**	**100**
Educational level	**Number**	**%**
No basic education	3	6
Primary level	41	82
Secondary level	6	12
University level	0	0
Total	**50**	**100**

Source: COOPRIKI-CYUNUZI Management, 2015

4.4.2.1.Gender of respondents

From the sampling of fifty (50)COOPRIKI-CYUNUZI's memebers,19 (38 %) are male, 31 (68%) are female. This may illustrate that females are most engaged in rice farmingthan males in COOPRIKI-CYUNUZI.

Figure 4.1.: Gender of respondents

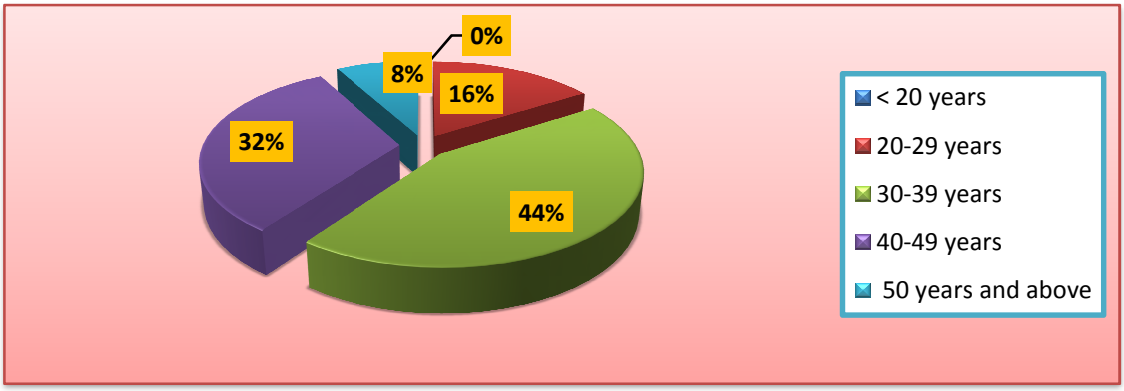


Source: COOPRIKI-CYUNUZI Management, 2015

4.4.2.2.Age class of respondents

Respondents have been classified in five(5) age classes as seen in the Table4.2.provided above. The majority of rice producers in COOPRIKI-CYUNUZIranges in the age class of 30-39 years (44%), followed by the age class of 40-49 years (32%). Theage class of 20-29 years (16%) comes in third position, followed by producers with 50 years and above (8%).There are no respondents in the sample size represented in the age class of (< 20 years). The results show that the average farming age of rice producers in COOPRIKI-CYUNUZI may be 35 years. Therefore, active rice producers in the cooperative are in the thirty years. Rice producers in the forty years are also active in rice farming more than people in the twenty years. Young people are absents, and aged producers are less represented in the cooperative. Results show that the most active working years are ranging from 30 to 50 years.

Figure 4.2.:Age class of respondents

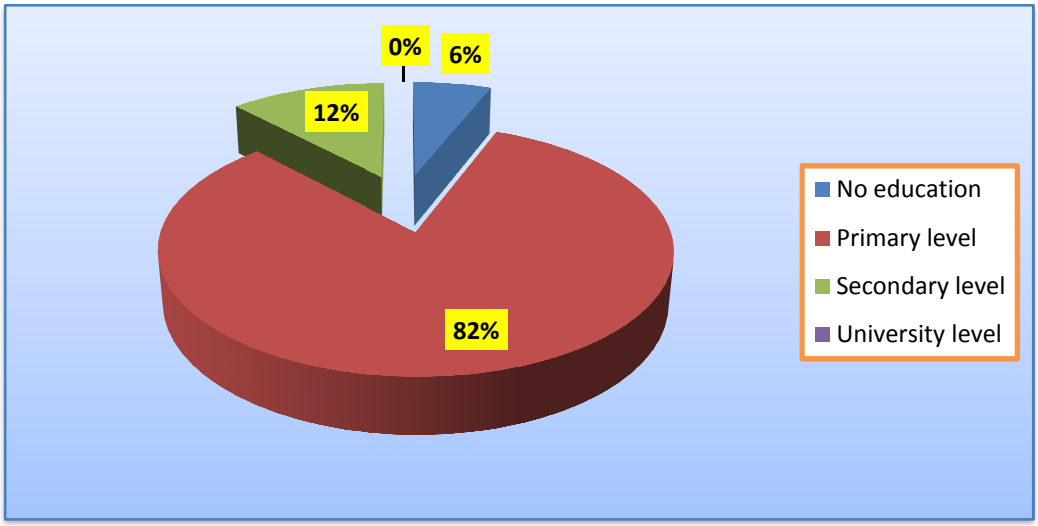


Source: COOPRIKI-CYUNUZI Management, 2015

4.4.2.3. Education level of respondents

The education level shows that most of respondents (82%) have completed the primary level, while only (12%) have completed the secondary level.Respondents who did not received any basic education represented 6%), while respondents who have completed the university level in COOPRIKI-CYUNUZI represented (0%). This may be explained by the fact that, people who have another permanent employment such teachers, medical staff, government officers are not allowed to be part of the cooperative.

Figure 4.3.: Educational level of respondents



Source: COOPRIKI-CYUNUZI Management, 2015

4.4.3.Sources of credit for different activities conducted by rice growers

4.4.3.1. Inputs acquisition process

ENAS Company supply fertilizers to COOPRIKI-CYUNUZI, the funds needed for the inputs acquisition are most provided by Urwego Opportunity Bank and SACCO Gatore. Recently, Banque Populaire du Rwandastarted to advance a small loan to rice producers for inputs acquisition. The process is coordinated by the Management of COOPRIKI-CYUNUZI.

The cooperative prepares the loan application letter to UOB for the inputs needed for the season. Further, the following information is provided along the loan application letter: (i) list of members with their IDs, (ii) area (hectares) cultivated by each one, (iii) the quantity of fertilizers (Urea and NPK) needed by each member.One (1) kg of Urea costs 390 Frw and (2) kgs cost 540 Frw/kg of NPK are required for one(1) acre cultivated. Thus, the list provides to UOB all the information required, including the total cost/loan required by COOPRIKI's members before the beginning of the season.

Based on COOPRIKI's loan request, UOB makes a direct payment to the inputs supplier (ENAS Co Ltd). Then, ENAS Co, Ltd supplies inputs to COOPRIKI-CYUNUZI cooperative, which in return distributes fertilizers to its members.

UOB provides repayment period of (8) months to COOPRIKI: (6) months for rice farming and (2) months for rice paddy commercialisation. The cooperative will repay the loan amount plus

interests of the period. At harvest, when the cooperative collects the paddy from members and makes paddy sells to different markets, the accountant will process the payments to farmers after deducting fees for the UOB loan repayment. Payments to farmers are made through transfers made by the cooperative to farmers'accounts opened in local SACCOs.

The Government subsidizes indirectly the inputs at 105 Frw /kg of fertilizer sold. Assuming that all the total 618 hectaresequal to 618.000 acres of the marshlands are cultivated in each season for rice production. Un (1) kg of Urea costs 390 Frw and (2) kgs cost 540 Frw/kg of NPK are required for one (1) acre cultivated, 618.000 acres will require 194.670.000 Frw (105 Frw x3kgsx618.000) for government'subsidies per season.

The table 4.3shows total loans provided by Urwego Opportunity Bank to COOPRIKI-CYUNUZI, as well as estimated Government financial support, all provided for inputs acquisition on a period of four(4) successive seasons.(COOPRIKI Management, primary and secondary data).

Table 4.3.:Loans and Governement'subsidies provided by UOB to COOPRIKI for inputsacquisition (Season B 2014- Season A 2016)

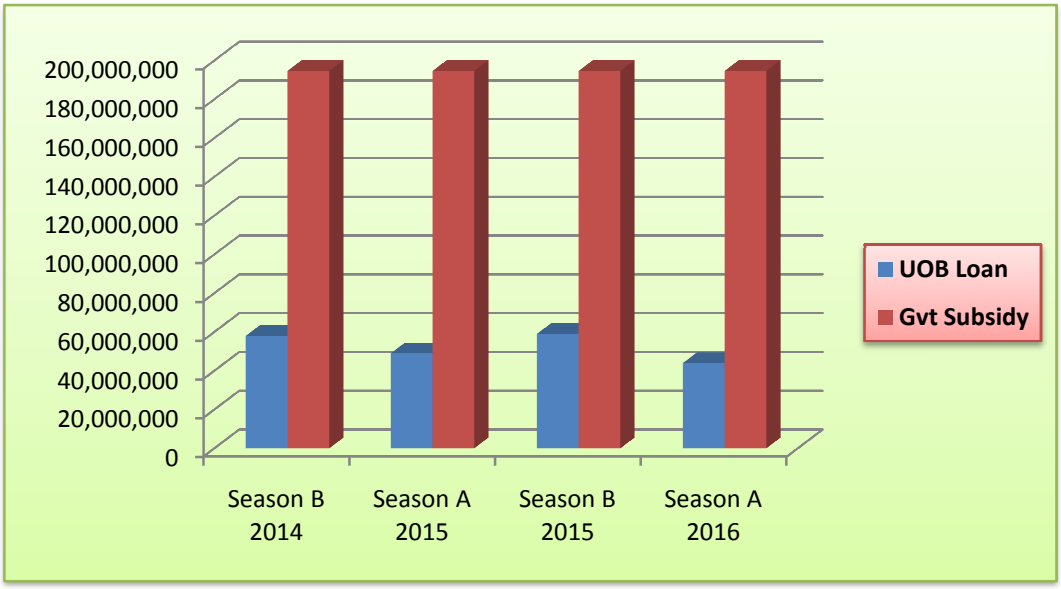
Period	UOB Loan	Gvt Subsidies
Season B 2014	58,000,000	194,670,000
Season A 2015	49,000,000	194,670,000
Season B 2015	59,000,000	194,670,000
Season A 2016	44,000,000	194,670,000
Total loans received	**210,000,000**	**778,680,000**

Source: COOPRIKI-CYUNUZI Management, 2015

In a period of four(4) successive seasons, UOB has provided a total loan worth 210.000.000 Frw, and the Government has provided an estimated a total subsidy of Frw 778.680.000 to COOPRIKI-CYUNUZI for inputs acquisition.

Figure 4.4.illustrates loans and government's estimated subsidies provided to COOPRIKI-CYUNUZI in four(4) successive seasons (Season B 2014-Season A2016) for inputs acquisition.

Figure 4.4.: Loans and Government subsidies received by COOPRIKI-CYUNUZI for inputs acquisition (Season B 2014-Season A2016)



Source: COOPRIKI –CYUNUZI Management, 2015

4.4.3.2.Source of credit for field operations

Field operations include rice nurseries establishment and maintenance, plowing, pudding, fertilizers and chemicals application, irrigation, weeding and birds guarding, and it takes 6 months for the rice paddy to mature.

Unlike for the inputs acquisition, field operations for rice growing receive less formal financing. Farmers were obliged to look for other alternative sources, such group savings commonly called "ibimina" in rural areas, money rented from relatives, etc. The table4.4. shows that the total loan amount received for field operations in COOPRIKI-CYUNUZI is much lesser that the inputs loan received in the same period (Season B 2014-Season A 2016).

In 2012, RSSP rehabilitated irrigation systems in COOPRIKI's marshlands at a cost of 75.000.000 Frw (COOPRIKI Management, secondary data).

The table 4.4.summarizes the formal credit amount that FIs provided to COOPRIKI-CYUNUZI for field operations.

Table 4.4.: Loans provided by FIs to COOPRIKI-CYUNUZI for field operations (Season B 2014- Season A 2016)

Season B 2014	Season A 2015	Season B 2015	Season A 2016	Total loans received
UOB		16,005,000		16,005,000
SACCO GATORE		15,800,000	23,000,000	15,800,000
BPR		1,500,000		1,500,000
Total loans received				**56,305,000**

Source: COOPRIKI –CYUNUZI Management, 2015

4.4.3.3. Sources of funds for Harvest and Post-Harvest investments and activities

As far as the rice is concerned, harvest and post-harvest periods require both short time working capital loans for the paddy collection and handling, as well as long term investment financing for Post-Harvest equipment (tauplins) and Post-HarvestH facilities (drying grounds and stores).

As to date, COOPRIKI-CYUNUZI has received a financial support from different stakeholders which helped the cooperative to establish Post-Harvest infrastructures along the rice cultivation areas in Cyunuzi and Kibaya marshlands.

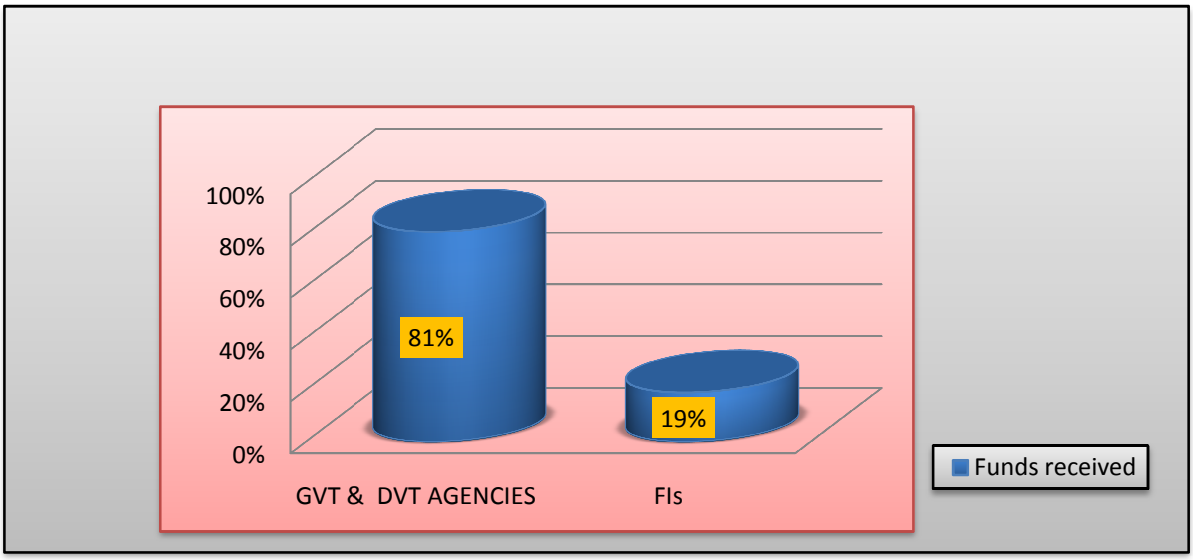
Table 4.5.: Funds received from stakeholders for COOPRIKI-CYUNUZI's Post-Harvest investments

Financing Agency		Funds received		% of Funds received	Post-Harvest equipment/Infrastructure	Period
GVT & DVT AGENCIES	RSSP	131,922,940	313,922,940	81%	12 drying yards	2008-2010
	KWAMP	84,000,000			6 drying yards	2010-2012
	NGOMA DISTRICT	28,000,000			2 drying yards	2014-2015
	KWAMP	70,000,000			3 drying yards & 3 stores	2015-2016
FIs	BPR	72,000,000	72,000,000	19%		
Toal Funds received		385,922,940	385,922,940	100%		

Source: COOPRIKI-CYUNUZI Management, 2015

Both, Government, development agencies and FIs have provided finance to COOPRIKI's post-harvest investments during the period starting2008 to 2016. The following Figure4.5.illustrates at which extent stakeholders have financed post-harvest investments in COOPRIKI-CYUNUZI.

Figure 4.5.: Funds received for Post-Harvest investments in COOPRIKI-CYUNUZI



Source: COOPRIKI CYUNUZI Management, 2015

4.4.3.4. Sources of credit forpaddy marketing and selling

The paddy is collected from members to the local collection centers, and then, from local collection centers to the main collection center, at the premises of COOPRIKI-CYUNUZI in Gatore sector. From there, either the cooperative takes the produce to different markets, or buyers come to collect the paddy from COOPRIKI's main collection center.

In season B2015, UOB provided a loan worth 165.000.000 Frw to COOPRIKI in order to allow the cooperative collecting the paddy from farmers, while USADF-Rwanda provided the cooperative a "Paddy Purchase Fund" worth 25.000.000 Frw. COOPRIKI sold the paddy to different markets, at different prices. Transport fees may be included or not in the selling price (primary and secondary data, COOPRIKI Management).

Table 4.6.: Sells of paddy produced by COOPRIKI-CYUNUZI in Season B 2015

Buyers in Season B 2015	Quantity of paddy sold	Unit Price(Frw)	Total sells
Kayonza Rice Milling Company	500,000	255	127,500,000
Region Trading Company Ltd	300,000	275	82,500,000
Alpha Supply Food Company Ltd	700,000	250	175,000,000
Total sells	**1,500,000**		**385,000,000**

Source: COOPRIKI CYUNUZIManagement, 2015

After selling the paddy for a total amount of 385.000.000 Frw, COOPRIKI has reimbursed the loan of 165.000.000 Frw received from UOB plus interests, and has made a profit margin.

4.4.3.5. Conclusion on utilization of funds received

COOPRIKI-CYUNUZI received both formal credit from FIs as well as funds from the Government or other support organizations to finance different activities during rice paddy primary production, harvest and post-harvest, paddy marketing and sellingfrom for the period (Season B2014 to Season A2016).

With regard to funds provided by FIs, Government and development agencies, results show that:

- Inputs acquisition received a total amount of Frw 988.680.000. The loan from FIs equal to Frw 210.000.000 represents 21% of funds received, Government and development agencies' financial supportequal to Frw 778.680.000 represents 79%.

- Field operations received in total insignificant amount totaling Frw 131.305.000 compared to inputs acquisition for the same period. The loan amount from FIs equal to Frw 56.305.000 represents 43% of the total funds received,Government and development agencies'financial support which is Frw 75.000.000 represents57% of the total funds received for that activities.

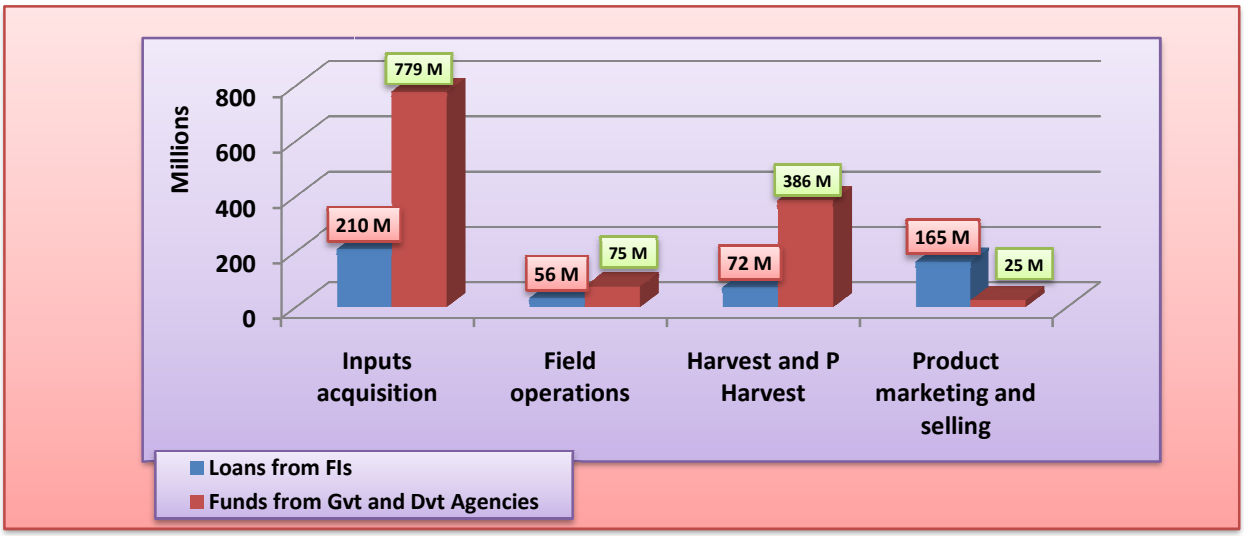
- Funds received by the cooperative for Post-Harvest activities and investments are totaling Frw 385.922.940. The cooperative received less loan amount equal to Frw 72.000.000 representing 19% and much Government and development agencies'financial support equal to Frw 313.922.940, representing 81% of total funds received.

- Paddy product marketing and sellingactivities received total funds equal to Frw 190.000.000, including the loan rceived from UOB equal to Frw 165.000.000 representing 87% of the total funds received, and insignificant Government and development agencies'financial support of Frw 25.000.000 representing 13% of the total funds received.

- FIs are still reluctant to provide adequate finance to agriculture activities along the value chain, Governement and related agencies provide financial support to AVC activities in form of subsidies or grants, mostly for inputs acquisition and Post-Harvest investments, field operations are negligated.

- MFIs and SACCOs are the most loans providers in the primary production, while commercial banks are interested by Post-Harvest investments and products marketing financing.

Figure 4.6.: Funds received by COOPRIKI-CYUNUZI during paddy production, Harvest &Post-Harvest and Marketing process(Season B 2014- Season A 2015)



Source: COOPRIKI –CYUNUZI Management, 2015

4.4.4. Constraints facing farmers in accessing finance for different needs/activities along the value chain

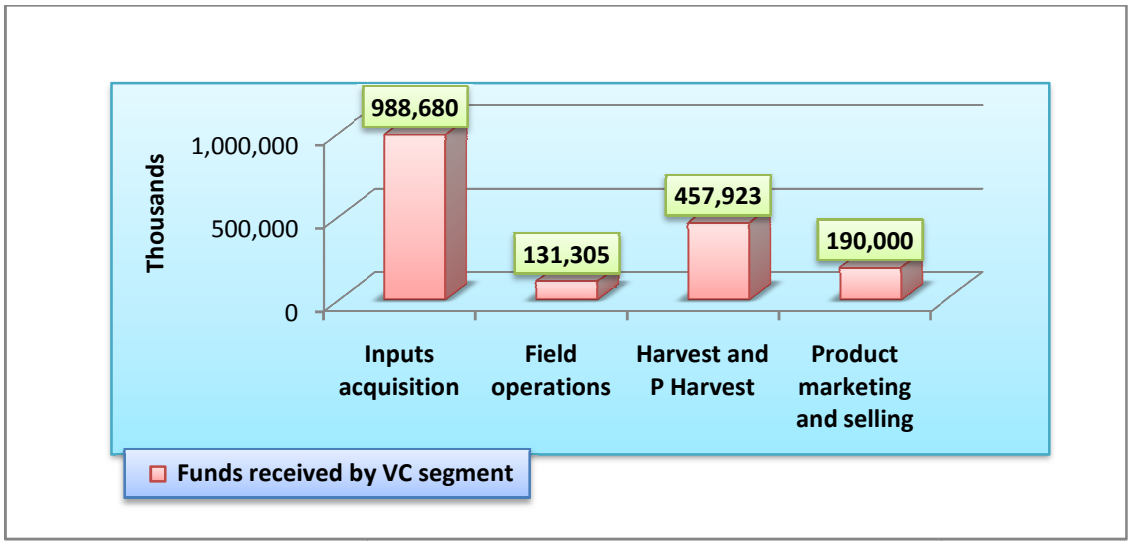
The constraints to access formal financing in FIs come from both sides: (i) the demand side (farmers) and (2) the supply side (FIs).

4.4.4.1. Constraints expressed by the demand side

Primary production is the segment of the AVC where farmers need a lot of finance for diversified activities. In COOPRIKI-CYUNUZI, primary production is concerned by two sub-segments: (i) inputs acquisition and field operations. In section 4.4.2., results show that Inputs acquisitions received a lot of government subsidies and much loans compared to other segments of the chain, while Field operations financing is left to farmers, farmers received insignificant resources both from FIs and Government affiliated agencies.

Figure 4.7. illustrateshow field operations in COOPRIKI-CYUNUZI received less attention from FIs and from Government affiliated agencies.

Figure 4.7. : Funds received by KOOPRIKI value chain segment



Source: COOPRIKI-CYUNUZI Management, 2015

Respondents revealed that small farmers encountered challenges for accessing formal credit in FIs to invest in rice farming activities, even if the fertilizers have been available. Reasons are being diversified: lack of adequate collaterals or guarantor, high interest rates, lack of bank information, lack of good business plans, etc.

Main constraints to access formal credit expressed by COOPRIKI's farmers were ranked on four-point scale:

- extremely high(4),
- high(3),
- high to some extent(2),
- high(1).

The scale was 4 to1 respectively. The constraints ranked were:

(i) Lack of collateral security

(ii) Lack of guarantor,

(iii) High interest rates,

(iv) Lack of information of bank information.

The frequencies of main constraints expressed by farmers were weighed and sum of the ranking was established in the table4.7. belowpresented.

Table 4.7: Constraints presented by COOPRIKI's farmers in credit acquisition

Constraints for farmers to access credit	4	3	2	1	Sum of Ranking	Position of Ranking
Lack of collateral security	26(4)	19(3)	3(2)	2(1)	172	1
Lack of guarantor	23(4)	21(3)	4(1)	2(2)	169	2
High interest rates	23(4)	20(3)	4(2)	3(1)	167	3
Lack of information of bank information	19(4)	17(3)	12(2)	2(1)	165	4
Lack of good business plans	21(4)	20(3)	6(2)	3(1)	165	4

Source: COOPRIKI current research questionnaire's repondents, 2015

Based on results presented in table 4.7., respondents in COOPRIKI acknowledged that Lack of collateral security is the highest factor that constraint farmer access to credit with a total aggregated score of 172 points, followed by Lack of guarantor as the second factor with a rank score of 169 points. High interest rates is placed third with the rank score of 167 aggregated points, Lack of information lack and lack of good business plan are both placed fourth as the last factor with aggregated rank score of 165 points.. This may be due to at the low educational level of the cooperative's members.

4.4.4.2. Constraints expressed by the supply side

Respondents coming from the FIs and support agencies which worked with COOPRIKI have been interviewed on constraints to access credit from the supply side (FIs). Six(6) main factors determining access to formal creditby farmers were identified and ranked on four-point scale:

- extremely important factor determing access to credit(4),
- important factor determing access to credit(3),
- important factor determing access to creditto some extent (2),
- not important factor determing access to credit(1)

The scale was (4) to (1) respectively. The determinants of access to formal credit selected were:

(i) Profitability of Investment
(ii) Collaterals
(iii)Interest rate
(iv)Level of risk bearing
(v) Availability of Credit
(vi)Loan transaction cost

The frequencies of determinants were weighed and sum of the ranking was established.

Table 4.8.: Factors influencing access to credit presented by the supply side (FIs)

SCALE/FACTORS	4	3	2	1	Sum of Ranking	Position of Ranking
Profitability of Investment	4(4)	1(3)	0(2)	0(1)	19	1
Level of risk bearing	4(4)	1(3)	0(2)	0(1)	19	1
Collaterals	3(4)	2(3)	0(2)	0(1)	18	2
Interest rate	3(4)	1(3)	1(2)	0(1)	15	3
Loan transaction cost	2(4)	1(3)	1(2)	1(1)	14	4
Availability of credit	1(4)	1(3)	2(2)	1(1)	10	5

Source: Primary data, 2015

It was discovered that the Profitability of Investment and Level of risk bearing were considered as extremely important factors and ranked firstas the highest among other factors having an aggregate rank score of 19points in the supply of agricultural credit.Collateral was placed second with total rank score of 18 points. The third place went to Interest rate witha total rank score of 15 points. Loan transaction cost a factor determining the supply of agricultural credit to farmers was placed in the fourth position having a total rank score of 14 points. Availability of credit was ranked fifth with a total rank score of 10.

4.4.5. Impact of finance received inCOOPRIKI - CYUNUZI on livelihoods of rice growers

Different forms of financing received by COOPRIKI's membersare estimated still to be increased, especially during the production period of 6 months. However,farmers acknowledged that, some positive changes happened in in their lives' standards, due to financial and technical support received from different stakeholders, including FIs, Government and affiliated agencies.

Chambers and Conway (1992), defined livelihood in these terms: **"A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living".** Which literally means "**livelihood**" is the means, activities, entitlements and assets by which people make a living.

In this section, the researcher wanted to see/show how financing received in COOPRIKI-CYUNUZI for rice paddy production have impacted the livelihoods of rice producers in terms ofpositive changes (new assets acquired, cattle, goats, motorcycle, savings made, new off-farm activities, increase in health services and education, …)that occurred during their experience by working with FIs and other development agencies through COOPRIKI-CYUNUZI.

Using the SPPS software, changes occured in the livelihoods of COOPRIKI's farmers due the financing received were analysed by a correlation analysis done between the financing received and seven(7) selected determinants of a livelihood of a small rural farmer, which are:

a. Level of productivity/Season
b. Level of investment in new assets/Year
c. Level of education services/Year
d. Level of health services/Year
e. Level of producer savings/Season
f. Level of diversified food consumption/Day
g. Level of diversified investment in off-farm activities/Year

The results of the correlation analysis done between the financing received and selected rural farmer livelihood's determinants are presented in the next table 4.9.

4.4.5.1. Definition of key-terms of the correlation analysis used

- **Probability value (P-Value):**The probability of getting the results you did (or more extreme results) given that the null hypothesis is true (Goodman SN, Royall R, 1988).
- **Critical value:**In hypothesis testing, a critical value is a point on the test distribution that is compared to the test statistic to determine whether to reject the null hypothesis. If the absolute value of your test statistic is greater than the critical value, you can declare statistical significance and reject the null hypothesis.*(*http://support.minitab.com).
- **Sample size (N):**Sample size is the number of observations in a sample. It is commonly denoted **n**or **N**(http://mathworld.wolfram.com).
- **Independent variable(Y):** The variable that is stable and unaffected by the other variables you are trying to measure. It refers to the condition of an experiment that is systematically manipulated by the investigator. It is the presumed cause. (http://libguides.usc.edu/writingguide/variables)
- **Dependent variable(X):** The variable that depends on other factors that are measured. These variables are expected to change as a result of an experimental manipulation of the independent variable or variables. It is the presumed effect. (http://libguides.usc.edu/writingguide/variables)
- **Correlation coefficient:**Correlation coefficients (denoted r) are statistics that quantify the relation between X and Y in unit-free terms.The closer r is to +1, the stronger the positive correlation. The closer r is to -1, the stronger the negative correlation:

- ✓ positive correlation (high values of X associated with high values of Y)
- ✓ negative correlation (high values of X associated with low values of Y)
- ✓ no correlation (values of X are not at all predictive of values of Y).

- **Interpretation of Pearson's Correlation Coefficient:** The sign of the correlation coefficient determines whether the correlation is positive or negative. The magnitude of the correlation coefficient determines the strength of the correlation. Although there are no hard and fast rules for describing correlational strength, I [hesitatingly] offer these guidelines:
  - ✓ $0 < |r| < .3$ weak correlation
  - ✓ $.3 < |r| < .7$ moderate correlation
  - ✓ $|r| > 0.7$ strong correlation

For example, r = -0.849 suggests a strong negative correlation.

(http://www.sjsu.edu/faculty/gerstman/StatPrimer)

4.4.5.2. Sample size and correlation variables of the correlation analysis

- **Sample size (N):50**
- **Independent variable(Y) :**Financing received in COOPRIKI-CYUNUZI (Total funds received: Frw 1.192.602.940, average fund received per member: Frw 417.578).
- **Dependent variables(X):** Determinants of livelihoods:

$\mathbf{X_1}$: Level of productivity/Season

$\mathbf{X_2}$:Level of investment in new assets/Year

$\mathbf{X_3}$: Level of education services/Year

$\mathbf{X_4}$: Level of health services/YearX_5: Level of producer savings/Season$\mathbf{X_6}$:Level of investment in off farm activities/Year$\mathbf{X_7}$: Level of diversified food consumption/Day

$$\mathbf{Y: X_{1+} X_{2+} X_{3+} X_{4+} X_{5+} X_{6+} X_7}$$

Table 4.9.: Correlation analysis between financing received in COOPRIKI-CYUNUZI and livelihoods of Cooperative's members

		Funds	Productivity	Assets	Education	Health	Savings	Off farm activities	Food consumption
Funds received	Pearson Correlation	1	.682**	.624**	.589**	.733**	.663**	.545**	.615**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000
	N	50	50	50	50	50	50	50	50
Level of productivity	Pearson Correlation	.682**	1	.847**	.862**	.700**	.949**	.774**	.727**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
	N	50	50	50	50	50	50	50	50
Level of investment in new assets	Pearson Correlation	.624**	.847**	1	.793**	.699**	.885**	.820**	.830**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
	N	50	50	50	50	50	50	50	50
Level of education services	Pearson Correlation	.589**	.862**	.793**	1	.778**	.853**	.801**	.711**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
	N	50	50	50	50	50	50	50	50
Level of health services	Pearson Correlation	.733**	.700**	.699**	.778**	1	.690**	.743**	.717**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
	N	50	50	50	50	50	50	50	50
Level of producer savings	Pearson Correlation	.663**	.949**	.885**	.853**	.690**	1	.795**	.747**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
	N	50	50	50	50	50	50	50	50
Level of nvestment in off farm activities	Pearson Correlation	.545**	.774**	.820**	.801**	.743**	.795**	1	.910**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
	N	50	50	50	50	50	50	50	50
Level of diversified food consumption	Pearson Correlation	.615**	.727**	.830**	.711**	.717**	.747**	.910**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	50	50	50	50	50	50	50	50

****. Correlation is significant at the 0.01 level (2-tailed)**

Source: COOPRIKI-CYUNUZ primary data,2015

4.4.5.3. Correlation's outputs/results

- **P-values: 0.00**
- **Critical value: 0.01**
- **Pearson's Correlation Coefficients:**
  - **a.** Level of productivity/Season:0.682
  - **b.** Level of investment in new assets/Year: 0.624
  - **c.** Level of education services/Year: 0.589
  - **d.** Level of health services/Year: 0.733
  - **e.** Increased producer savings/Season: 0.663
  - **f.** Level of investment in off farm activities/Year: 0.545
  - **g.** Level of diversified food consumption/Day: 0.615

4.4.5.4. Interpretation of results

In the correlation table 4.9., the financing received in COOPRIKI-CYUNUZI and seven (7) determinants of livelihoods($\mathbf{X_1}$, X_2, $\mathbf{X_3}$, X_4,X_5,$\mathbf{X_6}$,$\mathbf{X_7}$) of the cooperative's members have been correlated. Results are the following:

- For all determinants, all P-values **(PV)** are less than the critical value equal to **0.01**(**PVs<0.01**). That means that there is a positive relationship between the financing received in COOPRIKI-CYUNUZI and all the livelihoods' determinants (X_1 to $\mathbf{X_7}$).

- All Pearson's correlation coefficients **(r)** found for all determinants show a "moderate to strong" relationship between the financing received **(Y)** and determinants of livelihoods ($\mathbf{X_1}$ to $\mathbf{X_7}$)**:**

  - **a.** Level of productivity/Season:"r" equals to 0.682 indicates apositive moderate relationship between financing received and productivity.
  - **b.** Level of investment in new assets/Year:"r" equals to 0.624indicates apositive moderate relationship between financing received andinvestment in new assets.
  - **c.** Level of education services/Year:"r" equals to0.589indicates apositive moderate relationship between financing received andeducation services.
  - **d.** Level of health services/Year: "r" equals to0.733 indicates apositive strong relationship between financing received and health services.

e. Level ofproducer savings/Season: "r" equals to0.663 indicates apositive moderate relationship between financing received and producer savings.

f. Level of investment in off farm activities/Year: "r" equals to0.545 indicates apositive moderate relationship between financing received and investment in off farm activities.

g. Level of diversified food consumption/Day:"r" equals to 0.615 indicates apositive moderate relationship between financing received and diversified food consumption.

4.4.5.5. Conclusion on interpretation of the correlation's results

The correlation analysis conducted between the financing received in COOPRIKI-CYUNUZI and selected determinants of livelihoods of the cooperative's members shows that the independent variable**Y**(financing received in COOPRIKI-CYUNUZI) is positively correlated with all dependent variables :$\mathbf{X_1}$ to $\mathbf{X_7}$(selected determinants of livelihoods of COOPRIKI-CYUNUZI's members). In addition to that, P Values for all dependent variables are also less than the critical value for this analysis.

Therefore, based on above findings, the total financing worth Frw 1.192.602.940 received in COOPRIKI-CYUNUZI in the period covering Season B 2014 to Season A 2015have impacted positively the livelihoods of COOPRIKI-CYUNUZI's members considering positive changes that occured in all selected determinantsof livelihoods of rural rice growers.

4.4.6. Summary of results

Chapter Four has the purpose of presentingand interpresenting the results of the research study conducted on AVCF in COOPRIKI-CYUNUZI and its impact onlivelihoods of the cooperative's rice growers. Main findings can be summarized as follows:

a. In COOPRIKI-CYUNUZI, females are in majority (68%) than males(32%),most of the farmers have a low education primary level (82%, the average farming age classes range from 30 to 50 years.

b. COOPRIKI-CYUNUZI works in AVC model : the cooperative is linked to inputs suppliers and it supplies rice paddy to differents rice milling companies. COOPRIKI-CYUNUZI started working with Financial Institutions at different levels of the rice production (UOB for

inputs acquiition and paddy collection, SACCO Gatore for field opeations, Banque Populaire du Rwanda for field operations and Post-Harvest activities). The cooperative received technical and financial support from other stakeholders(Government and other development agencies:USADF-Rwanda, KWAMP, and RSSP).

c. COOPRIKI-CYUNUZI has received both financial support in forms of grants and Capacity building from Governement and developement agencies, and loans from few FIs :

   - ✓ Funds provided by the Governement and developement agencies were higher than the formal credits received, and they only focused on inputs acquisition and Post-Harvest infrastructured.
   - ✓ The financing provided by FIs to the cooperative is still insuffient to cover all the needs expressed by farmers during the primary production process, findings shown that during the paddy production process,the paddy takes 6 months to mature, and related field operations which required a lot of means are left to farmers themselves.
   - ✓ Both farmers and FIs expressed that farmers encountered constraints to access formal credit, such : lack of collaterals, lack of guarantor, high interest rates, lack of skills to develop banakble proposals, etc.

d. Farmers aknowledged that the financing received, even insufficient, it hasimpacted positively their lives standards. They aknowledged that by engaging them in rice production and working with Fis, Governemeent and affiliated agencies at some extent, they have increased access to health services, education services for their children, have acquired new assets (cattle, goats, motocycle, have rehabilitated their houses, etc).

4.5. CONCLUSION

The purpose of this Chapter Four was to present, analyze data collected and interprete the results.Farmers aknowledged that working in AVC model and accessing finance is very important for their livelihoods to change. Constraints to access finance are also to be taken into consideration by stakeholders.

Upon presentation of these findings, in the following Chapter Five, the researcher will propose some recommendations to different ACVF stakeholders with the purpose of improving the way AVCF models can work better to change the livelihoods of farmers engaged in agriculture related businesses.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1. GENEREAL CONCUSION

The aim of this study is to contribute to get a better understanding of the benefits that the AVCF approach can bring to improve rural farmers' social wellbeing whose livelihoods depend on agriculture.Findings presented in Chapter Four are supposed to partly respond the three(3) main questions of this study. Additional to that, the researcher attempted to formulate specific recommendations in the next section 5.2., which contributes to complete answering remaining points of theresearch questions not expressed by findings. Research questions and respective answers are formulated as follows:

Question 1:Are the existing alternative financial mechanisms, risk mitigation products and economic models for Value chain Finance approach work efficiently to raise the productivity and income growth for smallholder farmers?

Findings on Question (i):

- **COOPRIKI-CYUNUZI works in the Value Chain Model :**
  - ✓ Chain actors (inputs suppliers, farmers, traders, processors, consummers) are inter-linked, and chain suppoters (Gvt, donors, FIs) provide different services (technical and financial support) to the cooperative and to other chain actors.
  - ✓ Governement (KWAMP and RSSP Projects) and developement agencies(USADF-Rwanda) provide technical support to the cooperative in form of capacity building to COOPRIKI-CYUNUZI.

- **Accessing finance and technical support for chain activities/needs:**
  - ✓ With regard to accessing finance for the different chain activities during primary production, harvest, post-harvest and product commercialisation, COOPRIKI-CYUNUZI works with few Financial Institutions at different levels of the rice production (UOB provides credit for inputs acquiition and paddy collection, SACCO Gatore finances field opeations, Banque Populaire du Rwanda finances field operations and Post-Harvest activities).
  - ✓ The GoR and developement agencies also finance some activities/parts of COOPRIKI rice value chain in form of grants and subsided loans, especially for inputs (fertilizers) and basic infrastructures (drying facilities and warehouses).

- ✓ In the period covered by the study, findings shown that the funds provided by the Governement and developement agencies were higher than the formal credits received, and they only focused on inputs acquisition and Post-Harvest infrastructured. That shows again thatlocal FIs are still reluctant to finance Agriculture Value Chain'activities, even for COOPRIKI-CYUNUZI which is counted among cooperatives performing in rice production activities.

- ✓ Both financing provided by FIs, GoR and development agencies to the cooperative are still insuffient to cover all the needs expressed by farmers, especially during the primary production process. This part is negligated by financial providers during this critical period which requires however sufficient funds for increased productivity (application of chemicals, labor for weedding, plouwing, etc) and better product quality. Farmers didn't received much credit and GoR financial support during primary production.

Conclusion of findings for Question (i) :

- ✓ There is a considerable gap in the existing financial mechanisms, risk mitigation products and economic models that are in place forRice Value chain Finance in Rwanda.Farmers in COOPRIKI-CYUNUZI aknowledged that working with FIs at some extent, there are tangible positive changes remarkable that happened in their lives'standards (*increased access to health services, education services for their children, acquisition of solar energy facilities, acquisition of new assets, cowers, goats, pigs, rehabilitation of houses, education of children, health insurances, more savings, etc*). However, FIs still have a room to improve their lending capacity by promoting new adequate financial products that suit chain's needs, for example : *working capital loans for primary production and during product commercialisation, leasing for equipments such transport trucks, Warehouse Receipt System, Inventory Credit facilities during Post-Harvest period,* etc. Local FIs are required to work efficiently to maximize their lending opportunities in orderto cover the needs that arise from chain's activities. That may lead to better productivity levels, source of income growthfor smallholder farmers engaged in AVC's activities.

Question 2 : Which constraints are limiting smallholder farmers' accessing finance in Agricultural Value Chain model,and what can be done by stakeholders to overcome those constraints*?*

Findings on Question (ii):

Constraints expressed by both demand and supply sides

- ✓ Findings in chapter Four shown that, even farmers have received different forms of financing for their activities during paddy rice farming, access to formal credits from FIs (especially in commercial banks) is still a challenge. Numerous constraints were noted important while farmers apply for loans, such as : *lack of adequate collaterals or guarantor, high interest rates, lack of bank information, lack of good business plans*, etc.

- ✓ Findings also shown that internal factors determining farmers'access to credit in the supply side(FIs), such as : *profitability of investment, collaterals, interest rate, level of risk bearing, availability of credit, loan transaction cost*, etc, are not favorable to smallholders farmers.

- ✓ Therefore, there is still a lot of work to do in order to improve/increase provision of finance for different farmers'needs in the AVC.

What stakeholders shoud do to alleviate/overcome constraints limiting smalholder farmers accessing formal credit?

- ✓ This sub-question will be answered in the next section of recommendations, 5.2. In fact, each facilitator of the AVC should understand and play his role in promoting access to finance for smallholder farmers seeking loans for the needs arise from chain activities. Hence, Governments and affiliated agencies, Donor Programmes and NGOs are concerned for capacity building for both finance - demand and supply sides.

<u>Question 3:</u>How AVCF can impact the livelihoods of smallholderfarmers and what should be the roles of different stakeholders in promoting this approach?

Findings on Question (iii):

- **Positive changes noted in lives' standars due to accessing finance through COOPRIKI-CYUNUZI**
  - ✓ Farmers noted some changes that occurred in their lives, such, *access to increased health services,increased productivity,access to children's eduction, increased savings, acquisition of new assets,investment in in off-farm activities,* etc. This was due to the financing received for chain activities, their productivity increased and more incomes were gained.

- **Roles and responsabilities for stakeholders in the AVC**
  - ✓ Based on findings,theresearcher provided in the next and last section 5.2.,specific recommendations/interventions to different stakeholders (policy makers, AVC facilitators and financial services providers) that can improve the way "AVCF approach" is being implemented for a better financial inclusiveness and sustainability of rural farmers 'livelihoods. She alsodefined specific roles for each category of facilitators. Their roles should be understood well, separated and be inte-completed.

5.2. RECOMMENDATIONS TO DIFEERENTAGRICULTURE VALUE-CHAIN STAKEHOLDERS

5.2.1. To the policy makers/Governments:

Policy makers are recommended to enable a working environment for AVCF and provide directions to other stakeholders who are willing to promotethe financial activity on value chain practices in order to strengthen the rural livelihoods. Some recommendations can be formulated as follows, the list is not exhaustive:

- ***Support AVCF legislation:***Policymakers have a critical role to play in the creation of enabling AVCF environment. Legislation can support the certification of agricultural inputs, the registration of agribusinesses, regulations governing Warehouse Receipt Systems that enable collateralization of inventory;the development of industry standards, the opening of domestic and international markets, etc, as well as supporting regulations for agricultural

sub-sectors. It is important that policy makers provide to all AVC stakeholders and facilitators a common understanding of the regulatory bottlenecks, and how to overcome them, This can result in significant changes in the ACV enabling environment.

- ***Enhancing financial inclusion in AVCF*:**smallholder farmers should be assisted with affordable loans terms (affordable interest rates, raisonable longer payback periods, repayment models, etc) to enable them investing in farm activities that will generate sustainable incomes.

- ***Put in place mechanisms through which formal lending institutions can increase outreach in the rural areas* :**empowering farmers to establish rural savings and credit cooperatives that can help in mobilizing savings which can be used to create credit for those who want to borrow short term loans.

- ***Promote the cooperative mouvement for the purpose to regroup smallholder producers.***

- ***Promote value chain models and value chain financing models development* :** evaluation, dissemination, replication and expansion considering the best practices,using the big brother – small brother approach, incorporating value chain managers, etc.

- ***Build supportive alliances*:** policymakers can take the role in leading the collaboration between the public and private sectors (PPP models) to facilitate successful partnerships between smallholders, private companies and FIs to enable the AVCF scaling up successful smallholders' businesses.

- ***Contribute to risk mitigation* :** policymakers can advise how governement funds can be utilized in catalyzing agricultural finance and reducing risksrelated toagriculture finance by establishing AgricultureGuarantee Funds, agricultural insurance programmes, incentives for start-up businesses, etc.

5.2.2. To AVC facilitators: Donors/Agriculture Dvpt Agencies / Governments

From the guidance of policy makers, the government and other supporting agencies have to take their facilitation role and make sure that the financial system provides adequate finance to AVC actors that meet demands arising from activities along the value chain:

- ***Build capacity of small producers and other chain actors towards clear separation of roles:*** Value chain actors, facilitators and financial service providers should understand clearly their separate roles. Chain facilitators are expected to provide institutional capacity building to chain actors so that they can be able to apply and manage a loan from the FI. FIs cannot be expected to take over responsibility for capacity building and chain organisation, even though these interventions are vital for access to finance. These functions are better performed by chain facilitators(government agencies, donors, NGOs) with a designated budget and specific intervention programmes. in the same framework, training and teaching curricula needed to build the capacity required on AVCF concepts such as AVC financial instruments, VC business should be on the agenda for specialized development training institutes.

- ***Enhance sustainable market linkages between small-scale producers and agribusinesses:***The development of collaboration among actors requires linking chain actors in ways that facilitate discussions and information exchange among them. This can be done through commodity associations formed by the chain partners usingthe Public-Private Partnerships models, etc.

- ***Promote promising VCF strategy and business model development :*** Development agencies can play a constructive role in discussing with their partners the merits and disadvantages of one strategy and model versus another. Chain actors should agree on which business model or financial strategy that can work for them.

- ***Facilitate linkages between local financial institutions and leaders in value chains. Development :***After building the capacity of chain actors and assisting them to establish strategic alliances, the next step to be accomplished by chain facilitators is to facilitate value chain actors with Financial Institutions, and provide both them with training and technical assistance. Financial institutions that are not yet active in AVCF need assistance in understanding value chains and how to manage risks associated with lending to the agricultural sector.

5.2.3. To financial services providers (FIs)

As already seen, expanding access to finance to small producers enhance increase of productivity and yields, gross margins, creates employment in rural areas and causes the general economic growth,. Thus, adequate AVCF can impactpositively the social conditions and rural producers 'livelihoods.Therefore, FIs have to play their role in promoting easy access to financial services by smallholder producers and other value chain actors. With adequate AVCF, producers are able to realize the full potential,get enough inputs, fertilizers and chemicals, labor for field operations, and hence, produce much for the markets. In this regard, the following actions can be undertaken by FIs. The list is not exhaustive:

- ***Design Capacity Building and Training Curricula appropriate for AVCF :*** the following elements are to be considered :

  - ✓ **Ensure that there is market demand for the crops**: loans should be made only for crops with reliable buyers that have already been contracted.

  - ✓ **Create proper policies and procedures** to address some common AVCF risks when establishing the policies and procedures for value chain financing.

  - ✓ **Assess real financing needs:**loan officers should use appropriate tools to evaluate the total cost of production and should also identify points along the value chain where providing access to finance could bring the greatest value to small producers and would represent a good investment for the institution.

  - ✓ **Establish appropriate guarantees on individual loans** : such as group bonds and warehousing receipts, which should make it possible to lend to small farmers without requiring traditional forms of collateral.

  - ✓ **Design financial products and repayment schedules that meet specific needs :** interest rates should be set to cover costs and provide a profit margin.

  - ✓ **Distribute loans in vouchers :** those are suitable for the purchase of inputs from suppliers during different phases of the production cycle.

  - ✓ **Develop insurance products**against crop failure and weather-related risks.

- ***Multiply financial products to meet needs :*** Value chains require a variety of loan products as well as other financial services such as savings and insurance. In order to strengthen businesses, reduce risks, and create a healthy financial system, it is important that FIs investigate the financial needs of value chain from farmers to retailers. Tailored products and innovative approaches may be chosen for developing specific parts f the chain.

- ***Contribute to value chain strengthening :*** Financial Institutions have the potential to contribute to the strengthening of value chains through building knowledge and supporting the development of needed services. Rather than investing in one component of the chain, the Financial Institution can grow expertise in the chain, share this knowledge, and provide financing to support services. This not only benefits clients, but also expands lending opportunities while lowering risks.

- ***Strengthen risk assessment and lending criteria :***Value chains offer a structure and relationships that have great potential to reduce the risk of agricultural lending. It is incumbent on the Financial Institutions to evaluate risk and to take into consideration conventional criteria along with new criteria that encompass value chain knowledge and functioning. These may include: knowledge of actors and markets, risk management systems, transaction costs of delivering financial products, governance systems, observance of contracts, availability of inputs, services and other supports, etc.

- ***Involvement of the financiers in risk mitigating measures****:* It would be better if FIs (banks, MFIs) can be involved in different risk mitigating measures.

REFERENCES

Books

1. Davies, S., (1996). *« Adaptable Livelihoods. Coping with Food Insecurity in the Malian Sahel »*. London,MacMillan Press, 1966.

2. Donald, A., Lucy, C.J., Asghar, R. (1972). *« Introduction to Research in Education »*.New York: Holt, Rinehart and Winston, Inc., 1972.

3. Miller, C. and Jones, L. (2010). « *Agricultural Value Chain Finance, Tools and Lessons »*.Rome,FAO and Practical Action Publishing, 2010, Rugby, UK.

Journals,Articles and Reviews

1. Braun, V. and Clarke, V. (2006). « *Using thematic analysis in psychology »*. Qualitative Research in Psychology, 3 (2). pp. 77-101.

2. Chambers, R. and Conway, R. G. (1992). « *Sustainable Rural Livelihoods: Practical concepts for the 21 st Century »*. IDS Discussion Paper 296, IDS, Brighton, UK, February 1992, IDS, Brighton, UK , p. 6.

3. Chambers, R., 1989. *"Vulnerability, coping and policy"*.IDS Discussion Paper IDS Bulletin 20(2), Brighton, UK , pp. 1-8.

4. Chambers, R. (1995). « *Poverty and livelihoods: whose reality counts? »*. IDS Discussion Paper 347, Brighton, UK,pp. 191-204.

5. Conway, G.(1985). *"Agroecosystems analysis"*, Agricultural Administration**,** 20:31-55.

6. Ellis, F. (1998). Survey article: « *Household strategies and rural livelihood diversification »*. Journal of Development Studies, 35(1): pp. 1-38.

7. Gashayie, A., Manjit, S. (2015). « *Agricultural Finance Constraints and Innovative Models Experience for Ethiopia: Emprical Evidance from Developing Countries »*.Research Journal of Finance and Accounting, Vol.6, No7, 2015, p.42.

8. Goodman SN, Royall R (1988). Evidence and scientific research. *American Journal of Public Health* 78(12):1568–1574.

9. Miller, C. and da Silva, C. (2007). *"Value chain financing in agriculture"*. Enterprise Development and Microfinance, Volume 18 Numbers 2 & 3, June/September, 2007. Practical Action Publishing, Rugby, UK.

10. Olagunju F.I. and Ajiboye A. (2010). *"Agricultural Lending Decision: A Tobit Regression Analysis"*.African Journal of Food Agricultural Nutrition and Development. 10 (5).

11. Sen, A. 1984. *« Rights and capabilities »*.Values and Development, Oxford: Basil Blackwell: 307-324.

Reports, Technical Notes, Working papers, Workshops

1. IFAD (2009). *"A Profile of the Rural Poor"*. IFAD's 2009 Rural Poverty Report. ESA Working Paper No. 09-04, March, 2009.

2. KATHIRESAN, A. (2010). *« Rwanda Rice Report, Enabling Self Sufficiency and Competitiveness of Rwanda Rice,Issues and Policy Options »*, July, 2010.

3. KATHIRESAN, A. (2013). *« Rwanda's Rice Commodity Chain »*, October 2013.

4. Miller, C. (2008), *"Twelve Key Challenges in Rural Finance*". FAO Rural Finance Workshop, 28 Oct, FAO, Rome.

5. Miller, C. (2012). « *Agricultural Value Chain Finance Strategy And Design, Technical Note* ». IFAD, Rome, November, 2012.

6. Muiruri, E. (2007), *"Strategic partnership for finance"*. Presentation at the AFRACA Agribanks Forum, 2007.

7. Rugamba, A and Noni, P. (2013). « *Agricultural Value Chain Financing (AVCF) and Development for Enhanced Export Competitiveness"*, ADB, 2013.

12. UNIDO, CBN, BOI (2010)*." Unleashing Agricultural Development in Nigeria through Value Chain Financing"*.Working Paper, November 2010.United Nations Industrial Development Organization (UNIDO).Vienna, Austria, November 2010.

8. USADF-Rwanda (2012). *« COOPRIKI – CYUNUZI Grant document »*, 2012.

9. USADF-Rwanda (2012). *« COOPRIKI – CYUNUZI Technical and Market Analysis Report »*, Feb. 2012.

10. Vorley, B., Lundy, M. and MacGregor, J. (2008). *« Business models that are inclusive of small farmers »*. Paper prepared for FAO and the United Nations Industrial Development Organization (UNIDO) as background to the Global Agro-industries Forum, New Delhi, 8-11 April 2008.

11. Winn, M., Miller, C. and Gegenbauer, I. (2009). *"The use of structured finance instruments in agriculture in ECA countries"*. AGSF Working Document No. 26, FAO, Rome, 2009.

12. World Bank (1996). *"Nigeria Poverty in the Midst ofPlenty"*. The Challenge of Growth with Inclusion. A World Bank Poverty Assessment, May, 1996.

Web Resources

1. http://data.worldbank.org/topic/agriculture-and-rural-development:*Agriculture & Rural Development* | Data - The World Bank.
2. http://libguides.usc.edu/writingguide/variables
3. http://support.minitab.com/en-us/minitab/17/topic-library/basic-statistics-and-graphs/hypothesis-tests/basics/what-is-a- critical-value/
4. http://www.cynosure-consultants.com/agriculture.php: *Agricultural development.*
5. http://www.minagri.gov.rw:*Strategic Plan for the Transformation of Agriculture, Phase II (2009 -2012 (PSTA II),* February 2009.
6. http://www.minagri.gov.rw:*Strategic Plan for the Transformation of Agriculture, Phase III (2013 -2017 (PSTA III),* July 2013.
7. http://www.sjsu.edu/faculty/gerstman/StatPrimer/correlation.pdf
8. http://www.spaceoffice.nl/blobs/G4AW/countries/Rwanda/FINAL%20G4AW%20Quickscan%20Rwanda.p: *Quick Scan Rwanda, Geodata for Agriculture and Water facility, 2014.*
9. http://www.worldbank.org/topic/agriculture-and-rural-development *:Agriculture & Rural Development, World Bank.*
10. http://www.worldbank.org/en/publication/wdr/wdr-archive: *World development report 2008, Agriculture for Development.*
11. http://www.doe.virginia.gov/support/school_improvement/training/dta_student:*Types of Research Methods.* Adapted from Edvantia SBR Rating for TechnicalAssistance Programs and Services form (2007) and Carter McNamara Overview of Methods to Collect Information handout (1998).

APPENDIX: RESEARCH QUESTIONNAIRE

Topic: *"Improvement of Smallholder Farmers' Livelihoods Through Agricultural Value Chain Financing"*

Target Audience:

(i) COOPRIKI's selected rice producers

(ii) Selected staff in FIsand supporting agencies to COOPRIKI (UOB, Banque Populaire, SACCO Gatore, KWAMP, USADF –Rwanda)

Instructions to the respondents:

- *The researcher would like to encourage you to respond directly to the asked question. If you don't understand a question, please let the researcher know. Hopefully you'll feel free to respond openly and honestly.*
- *Tick the right answer(s)*
- *You can respond to more than only one sub-question where applicable*

QUESTIONS

SECTION I: BACKGROUND OF RESPONDENTS'CHARACTERISTICS

Q1. Gender

€ Male
€ Female

Q2. What is your age class?

€ < 20 years
€ Between 20 - 29
€ Between 30 – 39
€ Between 40 – 49
€ 50and above

Q3. What is your highest level of education?

€ No basic education
€ Primary level
€ Secondary level
€ University level
€ Another level, please specify ……

SECTION II: SOURCES OF FINANCING OF VALUE CHAIN ACTIVITIES

Q1. What are the sources of finance for inputs?(seeds, seedlings, fertilizers, chemicals,…)

- € Governement support
- € FIs loans
- € Own savings
- € Othe source. Please specify…..

Q2. What are the sources of finance for field activities?

- € Governement support
- € FIs loans
- € Own savings
- € Othe source. Please specify…..

Q3. What are the sources of finance for Harvest and Post-Harvest related activities?

- € Governement support
- € FIs loans
- € Own savings
- € Othe source. Please specify…..

Q4. What are the sources of finance for rice paddy collection and marketing?

- € Governement support
- € FIs loans
- € Own savings
- € Othe source. Please specify…..

SECTION III :CONSTRAINTS FACED BY RURAL FARMERS IN ACCESSING CREDIT

PART A : DEMAND SIDE/FARMERS

To what extent do you estimate the following factors constrain farmers in accessing a loan in FIs?

Q1. **Lack of collateral security**

- € Extremely high(4)
- € High(3)
- € High to some extent(2)
- € High(1)

Q2. Lack of guarantor

- € Extremely high(4)
- € High(3)
- € High to some extent(2)
- € High(1)

Q3. High interest rates

- € Extremely high(4)
- € High(3)
- € High to some extent(2)
- € High(1)

Q4. Lack of information of bank information

- € Extremely high(4)
- € High(3)
- € High to some extent(2)
- € High(1)

Q5. Which are other factors not mentioned above ?

PART B : SUPPLY SIDE/FIs

To what extent do you estimate the following factors candetermin the credit access by farmers in FIs?

Q1 Profitability of Investment

- € Extremely important factor determing access to credit(4)
- € Important factor determing access to credit (3)
- € Important factor determing access to credit to some extent (2)
- € Not important factor determing access to credit (1)

Q2. Collaterals

- € Extremely important factor determing access to credit(4)
- € Important factor determing access to credit (3)
- € Important factor determing access to credit to some extent (2)
- € Not important factor determing access to credit (1)

Q3. Interest rate

- € Extremely important factor determing access to credit(4)
- € Important factor determing access to credit (3)
- € Important factor determing access to credit to some extent (2)
- € Not important factor determing access to credit (1)

Q4. Level of risk bearing

- € Extremely important factor determing access to credit(4)
- € Important factor determing access to credit (3)
- € Important factor determing access to credit to some extent (2)
- € Not important factor determing access to credit (1)

Q5. Availability of Credit

- € Extremely important factor determing access to credit(4)
- € Important factor determing access to credit (3)
- € Important factor determing access to credit to some extent (2)
- € Not important factor determing access to credit (1)

Q6. Loan transaction cost

- € Extremely important factor determing access to credit(4)
- € Important factor determing access to credit (3)
- € Important factor determing access to credit to some extent (2)
- € Not important factor determing access to credit (1)

Q7. Which are other factors not mentioned above ?

SECTION IV : IMPACT OF THE AVC FINANCING ON LIVELIHOODS OF COOPRIKI's RICE PRODUCERS

A. At which extent do you estimate that the financing received in COOPRIKI-CYUNUZI have impacted positively the following factors of your live standard?

Q1.Level of productivity/Season

- € Between 800 kgs and 950 kgs
- € Between 951 kgs and 2.450 kgs
- € Between 2.451 kgs and 4.000 kgs and above

Q2. Level of diversified food consumption/Day

- € Money spent between 700 Frw and 950 Frw
- € Money spent between 951 Frw and 1.450 Frw
- € Money spent between 1.450 Frw and 1.950 Frw and above

Q3. Level of investment in new assets/Year

- € Money invested in new assets between 500.000 Frw and 800.000 Frw
- € Money invested in new assets between 801.000 Frw and 1.450.000 Frw
- € Money invested in new assets between 1.451.000 Frw and 2.450.000 Frw and above

Q4. Level of health services/Year

- € Money spent between 3.000 Frw and 12.000 Frw
- € Money spent between 12.001 Frw and 18.000 Frw
- € Money spent between 18.001 Frw and 27.000 Frw and above

Q5. Levelof producer savings/Season

- € Money saved between 50.000 Frw and 190.000 Frw
- € Money saved between 190.001 Frw and 500.000 Frw
- € Money saved between 500.001 Frw and 1000.000 Frw and above

Q6. Level of investment in off-farm activities/Year

- € Money invested in off-farm activities between 100.000 Frw and 300.000 Frw
- € Money invested in off-farm activities between 300.001 Frw and 1.000.000 Frw
- € Money invested in off-farm activities between 1.000.001 Frw and 2.000.000 Frw and above

Q7. Which are other factors not mentioned above ?

Briefly, give your general observations on impact of AVC financing on of liivelihoods of coopriki's rice producers.

Observations……
……
……
…….