UNIVERSITY of RWANDA

COLLEGE OF ARTS AND SOCIAL SCIENCES

MASTER'S OF DEVELOPMENT STUDIES

INVOLVEMENT IN AGRICULTURAL COOPERATIVE ACTIVITIES AND IMPROVEMENT OF LIVING STANDARDS IN RURAL AREAS: A CASE STUDY OF JYAMBERE MUHINZI WA HUYE COOPERATIVE RICE-GROWING ZONE.

A Thesis Submitted to the School of Governance as Partial Fulfillment of the Requirements for the Award of the Degree of Master's of Arts in Development Studies by the University of Rwanda.

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Huye, April, 2021

DECLARATION

I, Espérance AYINKAMIYE, declare that this dissertation entitled "**Involvement in Agricultural Cooperative Activities and Improvement of Living Standards in Rural Areas: A Case Study of JYAMBERE MUHINZI WA HUYE Cooperative Rice-Growing Zone"** is my original work and has not been published and/or submitted for any award in any other university.

Signed …….

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Date: ……

APPROVAL

This to certify that Mrs. Espérance AYINKAMIYE has worked on this thesis entitled "**Involvement in Agricultural Cooperative Activities and Improvement of Living Standards in Rural Areas: A Case Study of JYAMBERE MUHINZI WA HUYE Cooperative Rice-Growing Zone** " under my supervision. It is a bonafide work done as partial fulfillment of the requirement for the award of the Degree of a Master's of Development Studies by the University of Rwanda. This work has not been present to any other institution for any kind of award.

Signed……..... Date

Prof. KAMUZINZI MASENGESHO Huye: ……..

Supervisor

DEDICATION

To my Savior and Lord Jesus Christ and my family

ACKNOWLEDGEMENTS

I owe my profound heartfelt thanks the Government of Rwanda, the University of Rwanda and the College of Arts and Social Sciences in particular for their multifaceted assistance availed to bring this study to end.

Many sincere thanks go my husband Mr. Idrissa NDIZEYE for his invaluable support along the journey of my Master's studies. May the ALMIGHTY GOD bless him abundantly.

I am profoundly and exceedingly thankful to my supervisor Prof. KAMUZINZI MASENGESHO for his professional guidance, encouragement and commitment throughout the entire thesis writing.

My deep gratitude is expressed to the cooperative managers and rice growers for accepting to share their opinions and to respond positively. The data provided by those respondents was very useful to the successful accomplishment of this study.

I am greatly indebted to my parents, relatives, teachers, classmates, friends and all persons who, in one way or another, committed their intangible or tangible support to make this work a success. Please receive my gratitude from here.

Above all, I am inexpressibly grateful to the Almighty God for creating me and all persons who helped me accomplish this research. With you Sovereign Almighty Lord, everything is possible.

Espérance AYINKAMIYE

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ACRONYMS AND ABBREVIATIONS

EICV: Enquête Integrée sur les Condition de Vie (Integrated Living conditions survey)

FAO: Food and Agriculture Organization

FCA: Federal Cooperative Agency

GDP: Gross Domestic Product

GoR: Government of Rwanda

GSDRC: Governance and Social Development Research Centre

ICA: International Cooperative Alliance

IFAD: International Fund for Agricultural Development

NISR: Nations Institute of Statistics in Rwanda

ONS: Office for National Statistics

RCA: Rwanda Cooperative Agency

RWF: Rwandan Francs

SPSS: Statistical Package for Social Sciences

TFC: Tanzanian Federation of Cooperatives

UR: University of Rwanda

US: United States

USA: United States of America

USAID: United States Agency for International Development

USDA: United States Department of Agriculture

ABSTRACT

In Rwanda, cooperatives are relied upon because they are thought to improve operating efficiency and help improve the living standards of the population. Yet, households in Rwandan rural areas are said to be still vulnerable. The current study was carried out to investigate how involvement in rice growing activities has impacted on the improvement of households living standards of both cooperative and non-cooperative members operating in JYAMBERE MUHINZI WA HUYE Cooperative Rice-Growing Zone in Huye District. A sample of 207 respondents was randomly selected from a population of 346 rice growers. The sample comprised 175 respondents selected from 312 and 32 cooperative and non-cooperative members respectively. Data collected using a questionnaire filled in by cooperative and non-cooperative members were analyzed using SPSS and excel software. The findings indicated the extent of cooperative members' involvement in rice growing activities is greater than that of non-cooperative members. The findings also revealed a moderate extent of improvement of households living standards among cooperative members and a low extent of improvement of households living standards among non-cooperative members. This led the conclusion that involvement in rice growing activities has helped improve the households living standards among cooperative members better than among non-members. Correlation analysis revealed that, for the case of both cooperative and non-cooperative members, a significant relationship between involvement in rice growing activities and improvement of households living standards. It was recommended, among others, that the government should through its agricultural officials, make follow-up to ensure that the best and modern rice growing practices are adequately implemented by rice growers so as to increase the yields of the exploited land.

Key words: Agriculture, cooperative, households living standards, rice-growing, Rwanda.

CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND OF THE STUDY

In numerous countries across the world, cooperatives are said to play a considerable role in agriculture. For instance, the marketing of more than 50% of agricultural output is done through cooperatives in developed countries such as not Japan, USA, Canada and Denmark to name just a few. The significant role played by agricultural cooperatives, especially in rural areas, is also noted in developing countries where such cooperatives focus on marketing and supply in Asia and South America (RCA, 2011).

In Africa, the establishment of agricultural cooperative organizations by colonial governments took place before the occurrence of World War I. It was the white farming communities that firstly set up their cooperatives. With the purpose of accessing inputs and securing the sale of their production, native producers too formed agricultural cooperatives upon the authorization of the colonial masters (RCA, 2011).

In Rwanda, where agriculture is considered as a key drive for developing the economy and reducing poverty, according to GoR (2011), cooperatives have been adopted as an important vehicle to help implement policies and strategies that enable to intensify and increase market orientation with a focus on the smallholder farmers. The promising commodities that are considered as priority include rice, coffee, Irish potato, bean, maize, soya, horticulture, tea, wheat and pyrethrum even though the list proves to be dynamic. The very same source identified rice, wheat and soya bean as the potential substitutes for imports with rice on the top of the list since it is thought to offer a potential market country wide and regionally (MINAGRI, 2004).

Rice growing in Rwanda has two seasons per annum. Season A is concerned with rice planted in June and July the harvest of which takes place in October and December while Season B is concerned with rice planted in December and January the harvest of which takes in May and June (Ghins, L. & Pauw, K., 2018). The results of the Season A 2018 indicate that the average yield of rice in Rwanda was 3,420 kg/ha for paddy rice while it was 3,532 kg/ha for paddy rice in the Season B (NISR, 2018). In 2009, close to 62,000 farmers that were grouped in 55 cooperatives cultivated 12 000 ha leading to an average of 0.2 per one household. Projects financed by IFAD helped to introduce intensive cultivation method and the government set up

farmer cooperative schemes through mainly smallholder farmers grew rice (IFDA, 2009). Cooperatives were relied upon because they were thought not only to improve operating efficiency but also to help improve the living standards of the population by providing income and employment and opportunities mainly in the rural areas (RCA, 2011).

The need to raise household living standards in rural area has been highlighted in different reports published about Rwanda. For instance, A report published by NISR (National Institute of Statistics in Rwanda) in August and November 2015 on household living conditions revealed that notwithstanding the impressive progress made in raising the household living standards, there is still a lot that needs to be done with regard to rural area households living standards. For example, the prevalence of stunted children is 38%, wasting children rate is 2% while the underweight children rate 9%. The infant mortality ratio stood to 50 deaths per 1,000 while the maternal mortality ratio stood to 210 deaths per 100,000 live births (EICV, 2015).

Concerning the education, for primary education, the net attendance ratio was 87.4% in rural area against 91.2% in urban area while it was 19.3% for secondary school in rural area compared to 38.9% in urban area. For water and sanitation, households with improved sanitation represented 81.3% in rural area compared to 93.5% in urban area while households with access to improved drinking water sources were 83.7% in rural area versus 90, % in urban area (EICV, 2015).

Regarding housing, households with cement floor represented 12.4% in rural area versus 63.3% in urban area whereas for energy, households using electricity as main source of lighting electricity represented 9.1 in rural area compared to 71.8% urban area. Concerning assets ownership, households owning mobile phone were 58.6% in rural area against 87.9, % in urban area; households owning TV set represented 1.2% in rural area compared to urban 36.4% while households owning computer 0.5 in rural area versus to 12.2% in urban area (EICV, 2015).

All the figures above constitute irrefutable evidence that Rwanda still has a long way to go to improve living standard in rural area. It is probable that people who have actively involved themselves in rice cooperative initiatives have made better achievements in terms of increased households' living standards but further researches are needed to prove it. It is against this

background that the researcher is interested in conducting a research with a focus on involvement in rice cropping cooperative activities and households living standards improvement in rural areas taking JYAMBERE MUHINZI cooperative zone as a case study.

1.2 STATEMENT OF THE PROBLEM

Households in rural areas in Rwanda are by far more vulnerable to poverty than the ones in urban areas. According to the report of November 2018 by NISR, such inequality is indicated by consumption per adult equivalent mainly and other indicators including education, water and sanitation, housing, assets ownership and health. The report indicated that the consumption per adult equivalent was RWF570 in urban areas against RWF216 in rural areas in 2017. The report also indicated that the consumption in rural areas had reduced from RWF217 in 2014. About 45% of household members are dependents. 83% percent of individuals in Rwanda live in rural area while only 13% of them are in the category of those having the highest consumption (EICV, 2018).

Considering other indicators, inequalities in achievements are also observed between households in rural area and households in urban area. For instance, in education, the net attendance ratio for secondary school was 19.5% in rural area compared to 39.5% in urban area. Regarding water and sanitation, households with improved sanitation represented 85.9% in rural area compared to 93.9% in urban area. For housing, households with corrugated iron roof represent 90.6 % in urban area and 61.2% in rural area those with modern floor represent 71.9% in urban area and 19% in rural area. Concerning assets ownership, households owning mobile phone were 66.8% in rural area against 90.6 % in urban area; households owning TV set represented 5.3% in rural area compared to urban 40.7% With regard to health, 72.7% of households in rural area, compared to 79.5% in urban area, have health insurance (EICV, 2018).

All the above poor households living standards exist despite the Rwandan endeavor to promote cooperatives as essential tool to ensure those standards are adequate (RCA, 2011). The promotion of cooperatives is evidenced, among others, by USAID (2013) that reported a rapid expansion of the number of agricultural cooperatives, including rice growing cooperatives, in Rwanda. This expansion is justified by the fact that the majority of Rwandans especially in rural area, live on agriculture. What one can wonder whether involvement in agricultural cooperative activities, especially rice cropping cooperatives, have helped improve household living standards in Rwandan rural areas. The current study undertakes to answer

such an interrogation by investigate how involvement in agricultural cooperative activities can improve households living standards of farmers by comparing the case of the cooperative and non-cooperative members growing rice in JYAMBERE MUHINZI WA HUYE cooperative zone

1.3 OBJECTIVES OF THE STUDY

1.3.1 General objective

Generally, the objective of the study is to investigate how involvement in agricultural cooperative activities have helped improve households living standards of farmers by comparing the case of the cooperative and non-cooperative members growing rice in JYAMBERE MUHINZI WA HUYE cooperative zone.

1.3.2 Specific objectives

Specifically, the study was carried out to achieve the following objectives:

1. To examine the extent to which cooperative and non-cooperative members are involved in rice growing activities carried out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone.
2. To examine the extent to which households living standards of cooperative and non-cooperative members have improved due to rice growing activities being carried out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone.
3. To determine the relationships between the involvement in rice growing activities and improvement of households living standards of cooperative and non-cooperative members operating in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone.
4. To offer recommendations to improve the existing scenario.

1.4 RESEARCH QUESTIONS

1. To what extent are cooperative and non-cooperative members involved in rice growing activities carried out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone?
2. To what extent have households living standards of cooperative and non-cooperative members improved due to rice growing activities being carried out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone?
3. Are there any significant relationships between the involvement in rice growing activities and improvement of households living standards of cooperative and non-cooperative

members operating in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone?

4. What are recommendations necessary to improve the existing scenario?

1.5 RESEARCH HYPOTHESES

Set I:

- $H_{0:}$ There is no significant relationship between the involvement in rice growing activities and improvement of households living standards of JYAMBERE MUHINZI WA HUYE cooperative members.
- $H_{1:}$ There is significant relationship between the involvement in rice growing activities and improvement of households living standards of JYAMBERE MUHINZI WA HUYE cooperative members.

Set II:

- $H_{0:}$ There is no significant relationship between the involvement in rice growing activities and improvement of households living standards of non-cooperative members operating in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone.
- $H_{1:}$ There is significant relationship between the involvement in rice growing activities and improvement of households living standards of non-cooperative members operating in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone.

1.6 SIGNIFICANCE OF THE STUDY

In Rwanda, agricultural cooperatives still have a big role to play in their members' households living standards. This implies that there is need to know how they influence those members' households living standards. The contribution of this study is the extension of not only the existing theories and knowledge but also the existing literature related to the study field. It is by means of investigation into the involvement in rice-growing cooperative activities and the improvement of households living standards through a comparative study of members the operating in JYAMBERE MUHINZI WA HUYE cooperative zone that the current study was done.

Some of the recommendations were made to help the concerned people to improve the possible existing deficiencies. Others are expected to be very helpful to the actors of the economy such as the Ministry of Agriculture, policy makers, regulators, government authorities and agencies concerned with the promotion of cooperatives and households living

standards.

The researcher hopes that the study forms a basis for further research for other researchers who will find themselves with interest in research areas related to the current study. By referring to the findings of the current study, other researchers will be better enabled to the generation of further knowledge.

1.6 SCOPE OF THE STUDY

1.6.1 Subject scope

The study focuses on investigation into the involvement in rice-growing cooperative activities and the improvement of households living standards. Involvement in rice-growing cooperative was examined considering such aspects as the selection of quality seed and the preparation of land, the establishment of crop, the use and management of water, the use of fertilizers, and harvest and after harvest activities while improvement of households living standards was examined considering education, health services, income, assets ownership and housing as indicators. The study was done considering a case study of JYAMBERE MUHINZI WA HUYE cooperative rice growing zone in HUYE District.

1.6.2 Geographical scope

Concerning geographical scope, the current study was carried out on Rwandan territory specifically in HUYE District where one finds rural areas affected by poverty despite the presence of agricultural cooperatives in those areas.

1.7 ORGANIZATION OF THE STUDY

The thesis is organized into five chapters. The first chapter which is “Introduction”provides the backbone on which the entire work is built; the second chapter entitled “Literature Review” deals with the review undertaken to identify the gaps of knowledge and literature on the topic of research; the third chapter entitled “Methodology” provides a summary of tools and techniques that were used to examine the research issues relevant to the topic, the fourth chapter entitled “Data analysis and interpretation” provides the analysis of collected data and interpretation of the findings of the study while the fifth and last chapter entitled “Discussion of results, conclusion and recommendations” closes the work and provides the way forward for further researches.

CHAPTER TWO: LITERATURE REVIEW

This chapter deals with the review undertaken to identify the gaps of knowledge and literature on the topic of research. It assists in determining the direction of the study as it helps clarify operational definitions of key concepts and highlights the relationship between involvement in rice-growing activities and improvement of households living standards. Added to that, it examines the other studies in order to highlight the gap in the existing literature. Documentation from libraries and relevant websites facilitated the review.

2.1 KEY CONCEPTS

2.1.1 Cooperatives

"*A cooperative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise*" (ICA, 1995 and GoR, 2007). For Laidlaw (1974), "*a cooperative is a business enterprise that aims at complete identity of the component factors of ownership, control and use of service, three distinct features that differentiate cooperatives from other businesses*". According to TFC (2006), "*a co-operative is a group of people who work together voluntarily to meet their common economic, social, and cultural needs through a jointly owned and democratically controlled enterprise*". For the context of current study, the definition suggested by ICA and the GoR is adopted since it best fits into Rwandan context where the current study was conducted.

Applied in the context of agriculture, "*Agricultural cooperatives are socioeconomic organizations established to protect the economic rights of farmers and thus to obtain a higher level of profits"* (Laidlaw, 1981).Bontems & Fulton (2009) put it that through agricultural cooperatives, small farmers are allowed to get better prices for their produce and therefore enabled to overcome the powerful oligopsonist investor-owned firms. As per Cakir & Balagtas (2012), they enable farmers to negotiate better prices while Camanzi *et al.*, (2011) argued that they help improve individual their access to markets. All these definitions are considered in the context of the current study.

2.1.2 Rice-growing activities

G.Kranjac-Berisavljevic et al. (2003) grouped rice-growing activities into seeds selection and land preparation, crop-establishment, use of inputs, water management, rice processing, rice

milling and rice marketing whereas Surajit K. De Datta (1981) grouped them into land preparation for rice soils, water use and water management practices for rice, fertilizer management of rice, and harvesting and postharvest operations. Seeds selection and land preparation involve the choice good quality seed, the choice of seed of a suitable variety of rice, mixing and leveling the soil for seed planting; crop-establishment is concerned with transplanting the pre-germinated seedlings or direct seedling; use of inputs or fertilizer management involve the use of inorganic fertilizers and /or chemical fertilizers; water use and water management practices for rice involve the use of sufficient water in crop field, water conservation and proper drying of crop field; harvesting and postharvest operations: cutting, stocking, handling, threshing, cleaning, and hauling and selling or marketing (G.Kranjac-Berisavljevic et al., 2003, and Surajit K. De Datta, 1981).

2.1.3 Household

ONS (2015) defined a household as "*one person living alone, or a group of people (not necessarily related) living at the same address who share cooking facilities and share a living room, sitting room or dining area. A household can consist of more than one family, or no families in the case of a group of unrelated people"*. Isaac D. and Ephraim N.B. C., (2004), put it that a household is "*a person or a group of persons, related or unrelated, who live together in the same dwelling unit, who make common provisions for food and regularly take their food from the same pot or share the same grain store, or who pool their income for the purpose of purchasing food*". Both definitions are considered relevant for the context of the current study and are consequently adopted.

2.1.4 Living standards

Living standards, according to Zapf W. (2002) is similar to welfare. Welfare, according to Bent Greve (2008), *"is the highest possible access to economic resources, a high level of well-being, including happiness, of the citizens, a guaranteed minimum income to avoid living in poverty, and, finally, having the capabilities to ensure the individual a good life"*. Van Praag & Frijerts (1999) considers welfare as *"the evaluation assigned by the individual to income or, more generally, to the contribution to our well-being from those goods and services that we can buy with money"*. EICV (2015, 2018) characterize household living standards considering such aspect as education, health services, income, assets ownership and housing. The current study adopts the definition given by EICV (2015, 2018) since it best fits in the context of Rwanda where the current study was conducted.

2.2 RELATIONSHIP BETWEEN AGRICULTURAL COOPERATIVES ANDHOUSEHOLDS LIVING STANDARDS

This section is intended to not only highlight the relationship between involvement in agricultural cooperatives, especially rice growing cooperatives, and households living standards with emphasis on rural area but also examine critically different studies having relevance to the current study.

According to TFC (2006), cooperatives in general, help improve people's economic prospects as they can constitute a part of the programme leading to the reduction of poverty that faces many households in rural areas of developing counties. Somavia (2002) argued that cooperatives can assist households through the creation of decent jobs and income generation through resource mobilization. GSDRC (2011) put it another way that cooperatives are usually meant to promote, through stated principles and values, their members who belong to certain households.

Considering agricultural cooperatives, FAO (2011) argued that by creating sustainable rural development through employment and income creation, agricultural cooperatives help support small agricultural producers belonging to specific household. It argued further that the support is given by offering market opportunities to agricultural smallholder. Added to that, training in natural resource management and access to technologies, innovations, extension services and information are considered as support services provided to those producers through cooperative in a better way. Zhang-Y. Z, (2004) put it that through agricultural cooperatives, fertilizers and other inputs, transport, marketing of products, both processing and storage become possible to supply to the agricultural smallholders. Giagnicavi (2012) and Gibson (2005) considered home and agricultural activities and put it that marginalized women considered as development engines are socially and economically strengthened through cooperatives. In Tanzania, according to Ally M. Kimario (1992), agricultural cooperatives have proved to be institutions that are critical to rural development since they have been used for the purpose of achieving poverty alleviation among small holder farmer in rural area.

By providing a tool of obtaining inputs more cheaply, ensuring more productive farming and marketing the harvest more expensively to rural households; cooperative farming finds itself in position to contribute to farming output Milovanovic, V., et al (2016). Wanyama (2014) and BRRI (2015) argued that benefits flow to rice-growing households though agricultural

cooperatives as the latter not only facilitate group selling and procurement but also facilitate agricultural land and equipment group utilization. As per ECORD (2012), rice farming cooperatives help their rural rice farmer members obtain inputs on loan basis and the harvest is sold to those cooperatives at specific prices Benjamin and Brandt (2002) argued that significant rise of rice prices influences rural household welfare beneficially. However, Vo, L.T.T. and Nguyen, S.P. (2011) held that benefits from price increases fail to accrue to the rice growing households due to intermediaries involved in rice value chain.

According to Bola A., A., et al. (2012) rice farming significantly helps improve households living standards through the adoption of improved rice varieties and a significant role is played by rice farming cooperatives in facilitating rice farmers to obtain those varieties. A study conducted by Hossain et. Al. (2003) in Bangladesh showed that positive impact of improved varieties adoption was on rich households while it proved negative on poor households. A study by NIPRT (2013) in the very same country revealed that reliance on farming traditional methods among most of the households in rice farming activities in Bangladesh led to reduced yields that in end affected negatively households living standards.
From the above literature, it can be noted that agricultural cooperatives especially rice-farming cooperative affect households living standards in one way or another. Such a fact translates the existence of a relationship between both involvement in rice-growing cooperative activities and improvement of households living standards. Yet, the above authors fail to establish a relationship measured statistically. The current study intends to address such a gap through correlation analysis. Some studies relevant to the current studies have been conducted and are worth mentioning so as to better highlight the gap in the existent literature.

A study by BARAYANDEMA J. et al (2017) was conducted to analyse the rice value chain and the level of benefits distribution between the actors in the value chain. Using a research questionnaire combined with interview on sample of 322 rice farmers from 17 cooperative members together with 9 processors and 28 traders, the study found out that benefits distribution along the value chain was characterized with significant disparities. Although this study deals with rice farming activities in cooperatives, it does not tackle the aspect of improvement of households living standards of the members of cooperatives considered under the study. The current study deals with such omitted aspect.

A study by Nkurikiye, J., B., (2016), was intended to not only describe but also compare

technical efficiency levels and farm management practices considering smallholder rice producers found in Bugarama Rice Scheme. A sample of 139 farmers was used and results obtained through descriptive analysis of data collected by means of questionnaire revealed inefficiencies in the performance of cooperative under study. Though this is interested in rice-farming cooperatives, it is not concerned with the improvement of household living standards of the cooperative members. The current study takes interests in such aspect left out.

With the aim of analyzing the determinants of rice production and its profitability, Ingabire, C.et al, (2013) conducted a study on a sample of 46 rice growers in the watershed of Cyabayaga in Eastern province of Rwanda. The study revealed a significant contribution to rice yield by cultivated land and labour while capital investments in form of inputs proved not statistically significant. It revealed further that some of the farmers reported insufficient income. The study recommended access to input but farmers and agricultural trainings as ways to help improve the current scenario. This study too does not investigate the aspect of households living standards of members except though it refers to income which is one of the indicators of households living standards. The current study considerers such omitted aspect by considering many other indicators in addition to income.

To assessing the socio-economic effects of the KOPAKAMA cooperative on the welfare of the members in MUSHUBATI Sector, GISARO M. Y. B. et al., (2013), took a sample of 75 respondents and found out that improvement in farmers' socio-economic development was achieved by KOPAKAMA coffee cooperative and its coffee washing station through job creation for coffee producers, loans granting, increase of income, guaranteeing market and attractive prices for the members. It was also pointed out that the cooperative improved the coffee growers' socio-economic welfare by enabling to reduce poverty among households of coffeegrowers. However, this study did not show the correlation between the cooperative and welfare of coffee growers' households. The current study intends deals with such unconsidered aspect.

Using a sample of 80 respondents obtained using stratified, purposive, convenience and simple random sampling, Frank T., Mbabazi M., Jaya S., (2015), conducted a study to find out the contribution of SACCO services'terms on members' economic development using ZIGAMA in Rwanda as a case study. The relationship between saving services' terms and the economic development of members was found to be not only strongly positive but also

significant. While this study considers saving cooperatives and member's economic development, the current study focuses on involvement on rice growing cooperative activities and households living standards.

Another study conducted by Nuredin M. and Byeong W. L. (2014) to examine the role of cooperative societies in economic development found out that people exert control, through cooperatives, over theireconomic livelihoods. In this regard, cooperatives facilitate job creation, social development and economic growth. The study concluded that to achieve their effectiveness and success,cooperatives have to continuously attain two inter-related goals including the enhancement of viability and improvement of abilityto service its members. At the same time, cooperatives have to retain their economically viability, innovativeness and competitiveness. Whereas this study considers cooperatives in general, the current focuses on rice-growing cooperatives.

Josephine P. C., (2015) also conducted a study on a sample of 100 households selected randomly in order to examine the contribution of Savings and Credit Co-operative Societies(SACCOS) on Promoting Rural Livelihood in Makungu ward, Mufindi district in Tanzania. The study found out that SACCOS helped promote rural livelihoods in the area under study. The study recommended that SACCOs should devise strategies appropriate for addressing root causes of rural poverty including insufficiency of human resources, insufficiency of financial capital, inadequacy of physical capital and support activities instead of concentrating on business sector only. This study focuses on SACCOS, the focus of the current study is on rice-growing cooperatives in Rwanda.

A study conducted by Frederick O. W. et al (2008), to give evidence on the contribution of cooperatives' contribution to the reduction of poverty in Africa revealed a significant contribution of cooperatives to the mobilization and distribution of financial capital. Cooperatives have also not only helped create employment and income-generating constituted an education and training forum and helped solve other socio-economic problems. While this study considers cooperatives in Africa in general and is limited to poverty reduction that is one of the aspects of households living standards, the current study considers on rice-growing cooperatives and many other aspects of households living standards in Rwanda.

On a sample of 180 respondents randomly selected from 30 SACCOs, Thomas K. C. et al.,

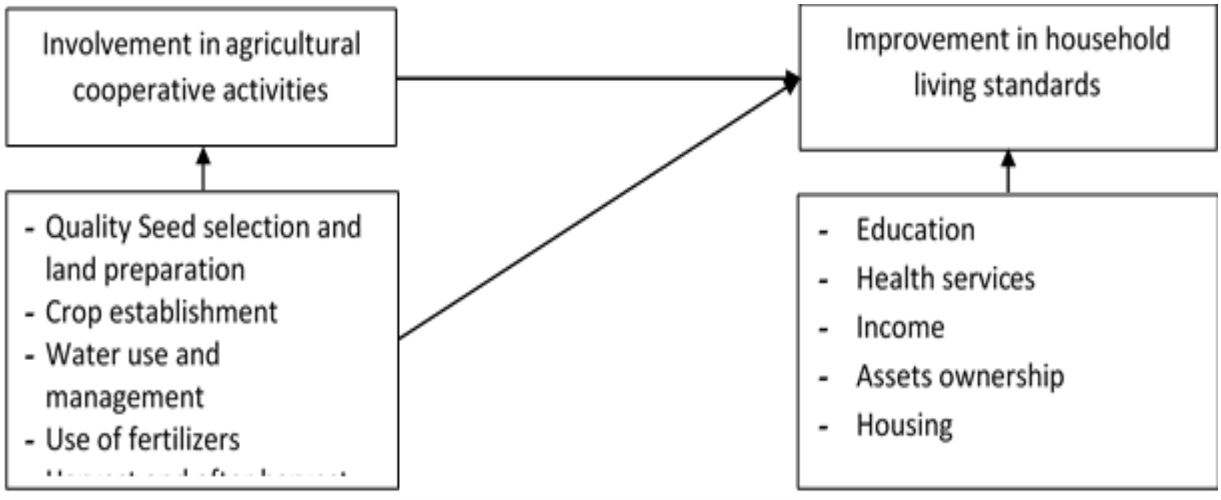
(2012), conducted a study with the purpose of determining how members' savings mobilization is affected by cooperative strategies. The findings revealed an average positive influence of training requirement on saving mobilization while a strong positive influence of investment opportunities on saving mobilization. This led to the conclusion that members' savings mobilization was partially affected by cooperative strategies. This study focuses on SACCOs, the current study considers on rice-growing cooperatives.

A study by Bezabih Emana, (2009) was conducted on key informants chosen using purposive sampling considering their leadership positions in the cooperative movement as a basis so as to analyze how cooperatives contributed to social and economic development in Ethiopia. Findings revealed that cooperatives contributed to socio-economic development through the reduction of poverty, income generation, creation of employment, and social protection. This study considers cooperatives in general in Ethiopia while the current study focuses on rice-growing cooperatives in Rwanda.

2.3 CONCEPTUAL FRAMEWORK

The conceptual framework of the study is as follows shown in figure below.

Figure 1: Conceptual framework



Source: Researcher's conceptualization based on extant literature from USDA (1998), Zapf W. (2002), Bent Greve (2008) and EICV (2015).

The figure 1 represents the conceptual framework of the study. It shows that this study examined two variables. On one hand, there is independent variable which can be stated as "involvement in agricultural cooperatives activities". This variable will be examined

considering quality seed selection and land preparation, crop establishment, water use and management, use of fertilizers and harvest and after harvest activities as sub-constructs.

On the other hand, there is dependent variable which can be stated as "improvement in household living standards". This variable will be examined considering education, health services, income, assets ownership and housing as sub-constructs.

2.4SUMMARY OF CHAPTER TWO

Under this chapter, operational definitions of four key concepts were clarified and the relationship between involvement in rice-growing activities and improvement of households living standards was highlighted. Moreover, other studies were examined in order to highlight the gap in the existing literature. Considering the existing literature and empirical studies, cooperatives have been subject to extensive research. Cooperatives are said to be of great importance in their members' households living standards. So far, few available researches conducted in Rwanda in the same area emphasized on agricultural cooperative. Bearing in mind that this review is not exhaustive, the conclusion that no previous research has been carried out in Rwanda to examine the relationship between involvement in rice-growing cooperative activities and households living standards can be drawn. Hence, there is a gap that needs to be filled with the help of the current study.

CHAPTER THREE: METHODOLOGY

This chapter contains a summary of tools and techniques that were used to examine the research issues relevant to the topic. It covers the research design, sample size, survey population, sampling procedures, data sources, data collection methods, variables measurement, data analysis, ethical consideration, and limitations of the study.

3.1 RESEARCH DESIGN

A cross-sectional design was used in combination with the survey design to achieve the research objective and answer the research questions. Whereas Mathers, N., (2007), defines a survey "*is a flexible research approach used to investigate a wide range of topics*"; Kate, A., L. (2014) considered a cross-sectional study as *"a study carried out at one time point or over a short-period*". A cross-sectional survey design therefore, involves, according to Linda, K., O. (2002), "*the collection of data at one point in time or over a short period of time from a sample selected to represent a larger population"*. A comparative approach was employed considering mainly cooperative members and non-members operating in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone.

3.2. SOURCES OF DATA

The sources of data used were both primary and secondary. Considering Douglas (2015), "*primary data is one which is collected for the first time by the researcher while secondary data is the data already collected or produced by others*". The very same source put it that the aim for which primary data is collected is to get the identified problem solved. The primary data were obtained from respondents using self-administered questionnaires so as to answer the research question questions and solved the highlighted problem. Secondary data were obtained through different textbooks, journals, internet websites, Government publications, and various reports in order to understand what other researchers have found out in relationship to the topic, to identify the problem and the gap in the existing literature.

3.3 STUDY POPULATION

"*A population is all the individuals or units of interest; typically, there is not available data for almost all individuals in a population*" (Bret, H., and Bret, L., 2011). The population of the current study comprises 346 rice growers including 312 members of JYAMBERE MUHINZI WA HUYE cooperative and 34 non-members growing rice in the same zone (JYAMBERE MUHINZI cooperative Archives, 2019).

3.4 SAMPLING

3.4.1 Sample size determination

"A sample is a subset of the individuals in a population; there is typically data available for individuals in samples" (Bret, H., and Bret, L., 2011). The sample size determination under the current study for cooperative members was done using the formula suggested by Sloven. This formula is stated as $n=\frac{N}{1+N(e)^2}$ where (n) represents the sample size and (N) depicts a given population. The determination of (n) is done at a 95% confidence level and 5% margin of error (e) with the help of related statistical table. The sample size for cooperative members then is calculated as follows:

$$n=\frac{312}{1+312(0.05)^2}=175.28$$

According to the Krejcie, R. V., & Morgan, D.W. (1970)' table shown among appendices, this figure is rounded to 175 as no respondents cannot be depicted in decimals. The same table enabled to determine a sample of 32 respondents out of a population 34 non-cooperative members operating in the zone. Therefore, total sample became of 207 respondents (175+32).

3.4.2 Sampling procedure

The sample selection was done using a combination of simple random and stratified sampling techniques. Stratified random sampling is defined by Mathers, N. (2007) as "*a way of ensuring that particular strata or categories of individuals are represented in the sampling process*" while simple random sampling, according to Ghauri, P. & Gronhaug, K., (2005), "*means that every case of the population has an equal probability of inclusion in sample*".

Under the current study, stratified sampling technique enabled the researcher to identified, from the population, two strata namely cooperative members and non-cooperative members. Respondents included in the stratified sample were selected using simple random sampling techniques. These respondents were given equal chance to be selected.

3.5 RESEARCH INSTRUMENT

The researcher used the questionnaire as the instrument of primary data collection. The questionnaire was used because it is considered appropriate tool to collect qualitative and quantitative data in a cross-sectional survey study design (Mathers, N., 2007).

The questionnaire comprised closed questions and open-ended questions that were rated using Likert scales. According to Singh, Y., K. (2006), Likert scale involves the use of a set of statements offered to the respondents, for a real or hypothetical situation, asking the respondents to show their level of agreement ranging from strongly disagree to strongly agree on a metric scale. The questions were rated using a 5 – point Likert Scale of strongly agree (5), agree (4), Neither agree nor Disagree (3), disagree (2) and strongly disagree (1).

3.6 MEASUREMENT OF VARIABLES

The current study involved two variables namely the independent variable stated as "involvement in rice growing activities" and the dependent variable stated as "improvement of household living standards". Under these variables, sub-constructs were identified through literature review and statements, against which respondents showed their levels of agreement, were formulated. The levels of agreement were translated by a 5-point Likert scales of strongly agree (5), agree (4), Neither agree nor Disagree (3), disagree (2) and strongly disagree (1) that helped to measure the variables.

3.7 DATA GATHERING PROCEDURES

When the research was being conducted, the researcher sought for the consent of the respondents. Afterwards, contacts were made and the questionnaires were administered for data collection. Data collection was followed by editing, coding was next, and tabulation for better data analysis followed and finally the final report was written.

3.8 ADMINISTRATION OF THE QUESTIONNAIRE

The questionnaires were administered after the researcher had sought for and obtained a recommendation letter from UR and the consent of respondents. After administration, the questionnaires were retrieved.

3.9 DATA PROCESSING AND EDITING

Data processing was done using Statistical Package for Social Scientists (SPSS) and Excel software. Questionnaires were organized by numbering them for validation and checking purpose after data had been collected. This was followed by the coding of questionnaires and data entry into computer system. Finally, meaningful information was produced from processed data stored in the form of tables.

3.10 DATA ANALYSIS

Data analysis required statistical analysis and responses made to each question were analyzed using both descriptive and inferential statistics. Whereas descriptive statistics focuses on organizing and summarizing the observations made, inferential statistics is concerned with the creation of conclusions reaching beyond the data observed (Scott, E., K., 2013). From descriptive statistics, the researcher got such tools of analysis as frequencies percentages and mean, that helped analyses responses for the respondents and results were shown in the tables extracted by means of SPSS and Excel software. From inferential statistics, through correlation analysis, the researcher got the Spears on correlation coefficient (r) that helped to determine the relationship between the variables under study and the results were shown in the tables extracted from SPSS software.

According to Mohamed, A., Z. (2015), *"correlation is considered as a statistical measure indicating the extent to which two or more variables fluctuate together*". The same author stated further that in case the relationship is between two variables, bivariate correlation is used as appropriated measurement helping to measure the strength and direction of such a relationship where the strength can range from absolute value 1 to 0. The closer to 1 the correlation coefficient is, the stronger the relationship. The equation giving the Pearson correlation coefficient is, as indicated by Mohamed, A., Z. (2015), stated as follows:

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2}}$$

In the formula above, $\bar{x}$ represents the mean of the values of variable x while $\bar{y}$ represents the mean of the values of the variable y.

3.11 ETHICAL CONSIDERATION

The ethical consideration was the concern of the researcher since before conducting the study the researcher sought for the authorization from the District and the cooperative authorities and for the respondents' consent. In addition, the researcher did his best to ensure the confidentiality of the respondents. To do so, the researcher was guided by neutrality, integrity and respect towards the respondents throughout the research.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

This chapter is intended to analyse and interpret the findings of the study. It involves the use of descriptive analysis, correlation analysis and ANOVA combined with comparative approach requiring to compare the findings about involvement in rice growing activities and improvement of households living standards of rice growing cooperative members and non-cooperative members.

4.1 PROFILE OF RESPONDENTS

Dealt with under this section are the demographics of the respondents. The variations of those characteristics are probed into using tables.

4.1.1 Gender distribution

The responses given by the respondents concerning gender distribution are presented in the following table:

Table 4.1: Respondents' gender distribution

Gender	Members			Non-members			All		
	Frequency	%	Cumulative %	Frequency	%	Cumulative %	Frequency	%	Cumulative %
Male	20	11.43	11.43	7	21.88	21.88	27	13.04	13.04
Female	155	88.57	100.00	25	78.12	100.00	180	86.96	100.00

Source: Primary data, 2019

The table 4.1 contains findings showing that females involved in rice growing activities in zone under study have by far in greater percentage of 86.96% compare to males who represented 13.04% of all respondents. The same observation is true for both rice growing cooperative members, where females and males represent 88.57% and 11.43% respectively, and non-cooperative members where females and males represent 78.12.% and 21.88% respectively. It is worth noting that there are more females and less males among cooperative members than among non-cooperative members.

4.1.2 Marital status

The marital status influences the generation and the spending of income in the households.

The next table contains information about respondents' responses.

Table 4.2: Respondents' marital status

Marital Status	Members			Non-members			All		
	Frequency	%	Cumulative %	Frequency	%	Cumulative %	Frequency	%	Cumulative %
Married	101	57.71	57.71	23	71.88	71.88	124	59.9	59.9
Single	34	19.43	77.14	5	15.62	87.50	39	18.84	78.74
Widow	40	22.86	100.00	4	12.50	100.00	44	21.26	100.00
Separated	0	0.00	100.00	0	0.00	100.00	0	0.00	100.00

Source: Primary data, 2019

It can be noted that, from table 4.2, the majority of respondents with a percentage of 59.9% are married. The fact that the majority are married people is relevant for both cooperative and non-cooperative members. Single respondents are in the smallest number considering all respondents as they represent 18.84% compared to widow representing 21.26%. This implies that the majority of respondents have relatively large households requiring them to do their best to make sure those households' living standards are continuously improved.

4.1.3 Age distribution

Age helps to get an idea about the maturity of respondents. Such maturity plays an important role in the performing such or such activities and managing households. The table below contains responses about respondents' age distribution.

Table 4.3: Respondents' age distribution

Age group	Members			Non-members			All		
	Frequency	%	Cumulative %	Frequency	%	Cumulative %	Frequency	%	Cumulative %
18-25	20	11.43	11.43	3	9.38	9.38	23	11.11	11.11
26-35	27	15.43	26.86	5	15.63	25.01	32	15.46	26.57
36-45	34	19.43	46.29	4	12.50	37.51	38	18.36	44.93
46-55	60	34.29	80.57	9	28.13	65.63	69	33.33	78.26
over 55	34	19.43	100.00	11	34.37	100.00	45	21.74	100.00

Source: Primary data, 2019

From the table 4.3, one notes that the highest percentage of 33.33% is represented by rice

growers whose age ranges from 46 years to 55 years. The age group is followed by the age group of respondents having over 55 years representing 21.74%. Next to this age group is the age group ranging from 36 years to 45 representing 18.36%. All these top three age groups represent 73.43%, the remaining 26.57% is for respondents that can be considered as the youth. This implies that rice-growing activities in the zone under consideration attract by far more old people that young people. This was due to the fact that, as per the interviewee, by the time plots were distributed for rice growing, aged people had been carrying out agricultural activities in the marshland. This put them in advantageous position to have access to the relevant information that enabled them to get the plot for rice growing.

4.1.4 Educational qualification

The level of education influences how people carry out their activities. The respondents' responses about their level of education are provided in the table below.

Table 4.4: Respondents' educational qualification

Educational qualification	Members			Non-members			All		
	Frequency	%	Cumulative %	Frequency	%	Cumulative %	Frequency	%	Cumulative %
None	21	12.00	12.00	9	28.13	28.13	30	14.49	14.49
Primary	141	80.57	92.57	22	68.75	96.88	163	78.74	93.23
Secondary	13	7.43	100.00	1	3.12	100.00	14	6.76	100.00
Undergraduate	0	0.00	100.00	0	0.00	100.00	0	0.00	100.00
Other	0	0.00	100.00	0	0.00	100.00	0	0.00	100.00

Source: Primary data, 2019

Findings in table 4.4 enable to note that the majority of respondents representing 78.74% primary educational level. The respondents who did not attend school represent 14.49% whereas respondents with secondary level representing 6.76% are in the smallest number. This implies that rice growing activities in the zone under study mainly attract people with low level of education. The same observation is valid for both cooperative members and non-members although the percentages differ. Such a situation may be due to the fact that, in Rwanda, educated people are much more interested in off farm activities than in on farm activities.

4.1.5 Experience in rice growing

It is beyond doubt that experience matters a lot for good performance in whatever people do. The information about respondents' experience is contained in the table below.

Table 4.5: Respondents' experience in rice-growing

Period in	Members			Non-members			All		
in years	Frequency	%	Cumulative %	Frequency	%	Cumulative %	Frequency	%	Cumulative %
Less than 1	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
1-2	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
2-3	20	11.43	11.43	5	15.63	15.63	25	12.08	12.08
3-4	61	34.86	46.29	27	84.37	100.00	88	42.51	54.59
4-5	67	38.29	84.57	0	0.00	100.00	67	32.37	86.96
over 5	27	15.43	100.00	0	0.00	100.00	27	13.04	100.00

Source: Primary data, 2019

The findings in table 4.5 show that the highest number of respondents, with a percentage of 42.51%, have an experience raging between 3 and 4 years in rice growing activities. It is worth noting that non-cooperative members, representing 84.37%, under this range are more than a double of cooperative members under the very same range. Respondents representing 45.41 % (32.37%+13.04%) have a rice growing experience of not less than 4 years. All these respondents are cooperative members. Elsewhere, it can be noted that 87.92% of all respondents have a rice growing experience of not less than 3 years. None of the respondents has less than 2 years in rice growing activities. This means that rice growers in the zone under study have a considerable experience in general.

4.1.6 Size of land cultivated

The size of land exploited is susceptible to enable the exploiter to generate much more harvest and there for more income, compared to the one exploiting small size of land other things being equal. This is true because larger size will lead to economies of scales. Provided in the following table is the information about respondents' responses about the size of land they cultivate.

Table 4.6: Size of land cultivated by respondents

Size of land in acres	Members			Non-members			All		
	Frequency	%	Cumulative %	Frequency	%	Cumulative %	Frequency	%	Cumulative %
5	74	42.29	42.29	24	75.00	75.00	98	47.34	47.34
10	61	34.86	77.15	8	25.00	100.00	69	33.33	80.67
15	27	15.43	92.58	0	0.00	0.00	27	13.04	93.72
20	13	7.43	100.00	0	0.00	0.00	13	6.28	100.00

Source: Primary data, 2019

Noticeable in the table 4.6 is the highest percentage of 47.34% of rice growers cultivating land of 5 acres each. These are followed by those with a percentage of 33.33% cultivating 10 acres each. Those with the largest size of cultivated land of 20 acres are in the smallest number and represent 6.28%. Those cultivating 15 and 20 acres represent 19.32% and are cooperative members. None of the respondents among non-cooperative members cultivates a land size of more than 10 acres. This implies that only cooperative members susceptible to possess larger sized land for rice growing purpose than non-cooperative members do. It can be noted that the smaller the size of cultivated land, the larger the number of rice growers cultivating small-sized land.

4.1.7 Monthly income

Income is necessary for spending for the survival of households among others. The information provided in the next table indicates the monthly income of respondents.

Table 4.7: Respondents' monthly income

Monthly Revenue in Rwf	Members			Non-members			All		
	Frequency	%	Cumulative %	Frequency	%	Cumulative %	Frequency	%	Cumulative %
Less than 20,000	74	42.29	42.29	28	87.50	87.50	102	49.28	49.28
20,000-30,000	67	38.29	80.58	4	12.50	100.00	71	34.30	83.58
30,001-40,000	20	11.43	92.00	0	0.00	0.00	20	9.66	93.24
40,001-50,000	14	8.00	100.00	0	0.00	0.00	14	6.76	100.00
50,001-60,000	0	0.00	100.00	0	0.00	0.00	0	0.00	100.00
Over 60,000	0	0.00	100.00	0	0.00	0.00	0	0.00	100.00

Source: Primary data, 2019

One can note that, in the table 4.7, the majority of all respondents with a percentage of 49.28% earn a monthly income of less than Rwf20,000 implying less than around RWF667 per day. This implies further that they are far from earning one US dollar ($) per day which is currently around 874 RWF/US dollar. In this category, non-cooperative members with a percentage of 87.50% of all non-cooperative members are little more than a double of cooperative members representing 42.29% of all cooperative members. The next category comprises respondents representing 34.30% of all respondents that earn a monthly income ranging from Rwf20,000 to Rwf 30,000 implying that they are close to earning $1 per day. Cooperative members under this category are a little more than a triple of non-cooperative members implying that there are more rice growers earning close to $1 among cooperative members than there are among non-cooperative members.

The category of those earning more than Rwf30,000, but not more than Rwf50,000, comprises 16,42% (9.66% +6.76%) of all respondents implying that they earn more than $1 but less than $2 per day. It is worth pointing out that respondents under this category are all cooperative members meaning that none of the cooperative members can afford to earn $1 per day from rice growing activities.

All in all, considering monthly income, it is obvious that cooperative members benefit more from rice growing activities than non-cooperative members do.

4.1.8 Current savings

Savings can mainly play a big role in making further investments that can enable to earn more income that can in turn be used in spending for improving households living standards. The following table contains information about respondents' current savings.

Table 4.8: Respondents' current savings

Savings in Rwf	Members			Non-members			All		
	Frequency	**%**	**Cumulative %**	**Frequency**	**%**	**Cumulative %**	**Frequency**	**%**	**Cumulative %**
None	87	49.71	49.71	29	90.63	90.63	116	56.04	56.04
Less than 100,000	81	46.29	96.00	3	9.37	100.00	84	40.58	96.62
100,000-200,000	7	4.00	100.00	0	0.00	0.00	7	3.38	100.00
200,001-300,000	0	0.00	100.00	0	0.00	0.00	0	0.00	100.00
Over 300,000	0	0.00	100.00	0	0.00	0.00	0	0.00	100.00

Source: Primary data, 2019

Findings in table 4.8 indicate that the highest number of all respondents with a percentage of 56.04% have no savings arising from rice growing activities. In this category, non-cooperative members have by far greater percentage of 90.63% compared to cooperative members with a percentage of 49.71%. Respondents representing 40.58% of all respondents have current savings of less than Rwf100,000 from rice growing activities. Contrary to the preceding category, non-cooperative members in this category are by very far less in number than cooperative members. Those with savings raging from Rwf100,000 to Rwf 200,000 are in the smallest number with a percentage of 3.38% and all are cooperative members. All the figures enable to note that cooperative members are in better position to make savings than non-cooperative members do.

The information about respondents conveys a certain understanding of some aspects relevant to the study. Yet, it does not enable us to know whether rice growers carry out their rice growing activities adequately in a way that justifies their current households living standards. The next details are intended to help understand other relevant aspects that the study is interest in.

4.2 INVOLVEMENT IN RICE GROWING ACTIVITIES

The first objective the study seeks to achieve is the examination of how cooperative and non-cooperative members involved in rice growing activities carry out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone. For achieving such objective, the researcher identified various indicators and sub-indicators of involvement in rice growing activities and

determined the extent to the rice growers, both cooperative and non-cooperative members, are attaining those indicators and sub-indicators. Those are determined using the interpretation of the mean. They are distinguished as very high, high, moderate, low and very low considering the responses from respondents on how they agree or disagree with the suggested statements. The determination of the extents indicated above was based on the interval of 0.80, between the mean, calculated as (5-1)/5. The interpretation of possible extents is as indicated here below.

Range	**Responses given**	**Interpretation**
4.20 - 5	Strongly Agree	Very high
3.40 – 4.20	Agree	High
2.60 - 3.40	Neither agree nor disagree	Moderate
1.80 - 2.60	Disagree	Low
1.00 – 1.80	Strongly Disagree	Very low

4.2.1 Involvement in rice growing activities among members

The results on how cooperative members are involved in rice growing activities carried out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone are as presented in the table below:

Table 4.9: Extents of involvement in rice growing activities among members

Indicators	**Mean**	**Interpretation**
Quality seed selection and land preparation	**5.00**	**Very high**
Choice good quality seed before cropping	5.00	Very high
Choice of seed of a suitable variety of rice that suit the cropping environment	5.00	Very high
Digging up the soil properly before mixing the soil for seed planting	5.00	Very high
Mixing the soil properly before planting the seed	5.00	Very high
Making sure the land is adequately leveled before I plant the seed	5.00	Very high
Crop establishment	**3.67**	**High**
Pre-germinating the seedlings in the seed bed on a timely basis	5.00	Very high

Reliance on transplanting the pre-germinated seedlings from seed-bed to wet field	5.00	Very high
Reliance on direct seedling in my rice cropping activities	1.00	Very low
Water use and management	**4.66**	**Very high**
Ensuring sufficient water in the rice field	4.66	Very high
Conserving sufficient water to be used in case of water scarcity	4.50	Very high
Drying the crop field on a timely basis	4.81	Very high
Use of fertilizers	**4.09**	**High**
Reliance on inorganic fertilizers to increase the yields	4.19	High
Reliance on chemical fertilizers to increase the yields	5.00	Very high
Reliance on both inorganic and chemical to increase the yields	4.28	High
Relying more on inorganic fertilizers and less on chemical fertilizers to increase the yields	2.88	Moderate
Harvest and after harvest activities	**2,33**	**Low**
Doing the cutting, stacking, handling, threshing, cleaning, and hauling manually	5,00	Very high
Doing the cutting, stacking, handling, threshing, cleaning, and hauling mechanically	1.00	Very low
Carrying out some of the harvesting activities manually and some others mechanically	1.00	Very low
Selling the harvest after drying it	5.00	Very high
Selling the harvest after milling it	1.00	Very low
Selling partially dried and partially milled harvest	1.00	Very low
INVOLVEMENT IN RICE GROWING COOPERATIVE ACTIVITIES	**3.95**	**High**

Source: Primary data, 2019

The table 4.9 contains findings showing the extent of cooperative members' involvement in rice growing activities by very high, high, moderate, low and very low extents. The indicator of quality seed selection and land preparation has a very high and full extent with a mean of

5.00. This was due to the fact that all its sub-indicators have the very same mean. The implication of such findings is that cooperative members are fully careful when they are selecting the seeds to be planted and preparing the land in which the seeds are to be planted. The indicator with the next very high, but not full, extent is water use and management with a mean of 4.66. All its sub-indicators are with very high, though not full, extent since the one with the smallest mean has a mean of 4.50. This also implies that cooperative members are very with water use and management in all aspects considered.

Use of fertilizers and crop establishment are other indicators of involvement in rice growing activities. These show high extents. The use of fertilizers has a mean of 4.06. The means of related individual sub-indicators indicate that cooperative members rely more on the use of chemical fertilizers (mean=5.00) than on the use of inorganic fertilizers (mean = 4.19) to increase the yield. The combination of both chemical and inorganic fertilizers is moderate with a mean of 2.88. The mean of crop establishment is 3.67. The specific means of related individual sub-indicators show that cooperative members rely on pre-geminating the seedlings in the seed bed that they transplant from there to wet field. They never rely on direct seedling in their rice growing activities

The remaining indicator shows a low extent with a mean of 2.33. The means of its sub-indicators show that cooperative members carry out their harvest and after harvest activities exclusively manually and sell their harvest only after drying it.

All in all, the overall mean of 3.95 indicated a high extent of involvement in rice growing activities. This implies that cooperative members carry out rice growing activities adequately. What one can wander is whether non-cooperative members are also doing the same. The following details focus on the findings about those non-cooperative members.

4.2.2 Involvement in rice-growing activities among non-members

The results on how non-cooperative members are involved in rice growing activities carried out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone are as
presented in the table below:

Table 4.10: Extents of involvement in rice-growing activities among non-members

Indicators	Mean	Interpretation
Quality seed selection and land preparation	**4.83**	**Very high**
Choice good quality seed before cropping	5.00	Very high
Choice of seed of a suitable variety of rice that suit the cropping environment	5.00	Very high
Digging up the soil properly before mixing the soil for seed planting	4.69	Very high
Mixing the soil properly before planting the seed	4.44	Very high
Making sure the land is adequately leveled before I plant the seed	5.00	Very high
Crop establishment	**3.42**	**High**
Pre-germinating the seedlings in the seed bed on a timely basis	4.38	Very high
Reliance on transplanting the pre-germinated seedlings from seed-bed to wet field	4.88	Very high
Reliance on direct seedling in my rice cropping activities	1.00	Very low
Water use and management	**4.15**	**High**
Ensuring sufficient water in the rice field	4.78	Very high
Conserving sufficient water to be used in case of water scarcity	3.38	Moderate
Drying the crop field on a timely basis	4.31	Very high
Use of fertilizers	**3.62**	**High**
Reliance on inorganic fertilizers to increase the yields	3.22	Moderate
Reliance on chemical fertilizers to increase the yields	4.59	Very high
Reliance on both inorganic and chemical to increase the yields	3.78	High
Relying more on in organic fertilizers and less on chemical fertilizers to increase the yields	2.88	Moderate
Harvest and after harvest activities	**2.98**	**Moderate**
Doing the cutting, stocking, handling, threshing, cleaning, and hauling manually	5.00	Very high
Doing the cutting, stocking, handling, threshing, cleaning, and hauling mechanically	1.00	Very low
Carrying out some of the harvesting activities manually and some others mechanically	1.00	Very low
Selling the harvest after drying it	4.63	Very high
Selling the harvest after milling it	3.38	Moderate
Selling partially dried and partially milled harvest	2.88	Moderate
INVOLVEMENT IN RICE GROWING COOPERATIVE ACTIVITIES	**3.80**	**High**

Source: Primary data, 2019

Findings in the table 4.10 that there exist very high, high, moderate, low and very low extents of non-cooperative members' involvement in rice growing activities depending on the indicators and their sub-indicators considered. Quality seed selection and land preparation is the only indicators having a very high extent with a mean of 4.83. All its sub-indicators also show very high extents. This implies that non-cooperative members are highly very careful when they are selecting the seeds to be planted and preparing the land in which the seeds are to be planted.

Indicator showing high extents is water use and management, use of fertilizers and crop establishment with means of 4.15, 3.62and 3.42 respectively. All water use and management related sub-indicators show very high extent except the conservation of water which has a moderate extent with a mean of 3.38. It is this mean that caused the indicator to have high extent instead of having a very high extent. High extent of water use and management implies that although non-cooperative members do their best to ensure efficient use and manage water, the conservation of water to be used in times of water scarcity is somehow a challenge for them.

Whereas sub-indicators related to the use of fertilizers enable to note that even though non-cooperative members use both inorganic and chemical fertilizers, they rely more on the use of chemical fertilizers than on the use of inorganic fertilizers; sub-indicators related to crop establishment indicate that non-cooperative members rely on pre-geminating the seedlings in the seed bed that they transplant from there to wet field. Direct seedling is not applied by non-cooperative members in their rice growing activities.

The only indicator showing moderate extent is that of harvest and after harvest activities that has a mean of 2.98. The related sub-indicators enable to note that harvest activities are done manually. Harvest selling is done mainly after dying although some non-cooperative members sell their harvest after milling while some others sell their partial harvest either after drying or after milling.

In a nut shell, the overall mean of 3.80 points out a high extent of involvement in rice growing activities. This conveys that non-cooperative members perform their rice growing activities adequately. What one can wander is how non-cooperative members' involvement in rice growing activities stands in relation to the involvement of cooperative members. The next

details provided findings about the comparison of cooperative and non-cooperative members' involvement in rice growing activities.

4.2.3 Comparison of extent of involvement in rice-growing activities

Since the study considers rice growers falling into two categories namely cooperative and non-cooperative members, a comparative approach was used so as to apprehend the difference between those two categories. The table below provides comparative information about the involvement of cooperative and non-cooperative members in rice growing activities.

Table 4.11: Compared extents of involvement in rice-growing activities

cators	Coop. Members		Non-coop. members	
	Mean	Interpretation	Mean	Interpretation
Quality seed selection and land preparation	**5.00**	**Very high**	**4,83**	**Very high**
Choice good quality seed before cropping	5.00	Very high	5,00	Very high
Choice of seed of a suitable variety of rice that suit the cropping environment	5.00	Very high	5,00	Very high
Digging up the soil properly before mixing the soil for seed planting	5.00	Very high	4,69	Very high
Mixing the soil properly before planting the seed	5.00	Very high	4,44	Very high
Making sure the land is adequately leveled before I plant the seed	5.00	Very high	5,00	Very high
Crop establishment	**3.67**	**High**	**3.42**	**High**
Pre-germinating the seedlings in the seed bed on a timely basis	5.00	Very high	4,38	Very high
Reliance on transplanting the pre-germinated seedlings from seed-bed to wet field	5.00	Very high	4,88	Very high
Reliance on direct seedling in my rice cropping activities	1.00	Very low	1,00	Very low
Water use and management	**4.66**	**Very high**	**4,15**	**High**
Ensuring sufficient water in the rice field	4.66	Very high	4,78	Very high
Conserving sufficient water to be used in case of water scarcity	4.50	Very high	3,38	Moderate
Drying the crop field on a timely basis	4.81	Very high	4,31	Very high

Use of fertilizers	**4.09**	**High**	**3,62**	**High**
Reliance on inorganic fertilizers to increase the yields	4.19	High	3,22	Moderate
Reliance on chemical fertilizers to increase the yields	5.00	Very high	4,59	Very high
Reliance on both inorganic and chemical to increase the yields	4.28	High	3,78	High
Relying more on soil inorganic fertilizers and less chemical fertilizers to increase the yields	2.88	Moderate	2,88	Moderate
Harvest and after harvest activities	**2,33**	**Low**	**2.98**	**Moderate**
Doing the cutting, stocking, handling, threshing, cleaning, and hauling manually	5,00	Very high	5,00	Very high
Doing the cutting, stocking, handling, threshing, cleaning, and hauling mechanically	1.00	Very low	1,00	Very low
Carrying out some of the harvesting activities manually and some others mechanically	1.00	Very low	1.00	Very low
Selling the harvest after drying it	5.00	Very high	4,63	Very high
Selling the harvest after milling it	1.00	Very low	3,38	Moderate
Selling partially dried and partially milled harvest	1.00	Very low	2,88	Moderate
INVOLVEMENT IN RICE GROWING COOPERATIVE ACTIVITIES	**3.95**	**High**	**3.80**	**High**

Source: Primary data, 2019

From the table 4.11, it can be noted that the extent of involvement in quality seed selection and land preparation is very high for both cooperative and non-cooperative members. Yet, the extent of involvement of cooperative members which has a mean of 5.00 is very higher than that of non-cooperative members which has a mean of 4.83.

Whereas involvement in water use and management shows a very high extent with a mean of 4.66 for cooperative members, the extent under the same indicator is high with a mean of 4.15 for non-cooperative members.

The involvement of both cooperative members and non-cooperative members in both the use of fertilizers and crop establishment proves shows high extents. However, the extents of

cooperative members' involvement in both the use of fertilizers and crop establishment, which have respective means of 4.09 and 3.62, are higher than those of non-cooperative members which have respective means of 3.62 and 3.42.

The only instance where non-cooperative members' involvement in rice growing activities shows a greater extent than that of cooperative members is about harvest and after harvest activities. Under this indicator, non-cooperative members' involvement has a moderate extent with a mean of 2.98 while cooperative members' involvement shows a low extent with a mean of 2.33.

In short, the overall extents of involvement in rice growing activities for both cooperative and non-cooperative members prove to be high. Yet, the overall extent of cooperative members' involvement in rice growing activities with a mean of 3.95 is higher than that of non-cooperative members' involvement in rice growing activities which has a mean of 3.80. This implies that cooperative members carry out rice growing activities better than non-cooperative members do. This might be due to the fact that cooperative members benefit from extension services given to them by the government through their cooperative.

4.3 IMPROVEMENT IN HOUSEHOLDS LIVING STANDARDS

The second objective pursued under the current study is to examine the extent to which households living standards of cooperative and non-cooperative members have improved due to rice growing activities being carried out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone. To achieve this objective, the researcher identified indicators of households living standards and examined the extent to which they have improved among cooperative and non-cooperative members carrying out rice growing activities in rice growing zone being considered under the current study. As it has been done previously, the extents are distinguished as very high, high, moderate, low and very low considering the responses from respondents on how they agree or disagree with the suggested statements. Similarly, the determination of those extents is based on the interval of 0.80, between the mean, calculated as (5-1)/5. The interpretation of possible extents is as indicated here below.

Range	Responses given	Interpretation
4.20 - 5	Strongly Agree	Very high
3.40 – 4.20	Agree	High
2.60 - 3.40	Neither agree nor disagree	Moderate
1.80 - 2.60	Disagree	Low
1.00 – 1.80	Strongly Disagree	Very low

4.3.1 Improvement of households living standards among members

The results on how households living standards have improved due to rice growing activities carried out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone are as presented in the table below:

Table 4.12: Extents of improvement of households living standards among members

Indicators	Mean	Interpretation
Education	**2.69**	**Moderate**
Increased ability to pay for children' s school fees	2.46	Moderate
Increased ability to buy school materials for my children	2.92	Moderate
Access to health services	**4,01**	**High**
Increased ability to pay for community-based health insurance for the family	4.43	Very high
Increased ability covers medical moderation ticket costs	4.11	High
Improved family nutrition	3.93	High
Improved family clothing	3.33	Moderate
Income	**3.13**	**Moderate**
Enabled to increase income	4.15	High
Enabled to make savings	2.92	Moderate
Enabled to make other investments	2.33	Low
Assets ownership	**2.73**	**Moderate**
Enabled to acquire certain equipments needed at my home	3.05	Moderate
Enabled to acquire domestic animals	2.42	Low
Housing	**1.48**	**Very low**
Enabled to build a house	3.15	Moderate
Enabled to cement my house because	1.78	Very low
Made house expansion possible	1.30	Very low
Made house electrification possible	1.77	Very low
Enabled to renew the house roof	1.12	Very low
IMPROVEMENT OF HOUSEHOLDS LIVING STANDARDS	**2.73**	**Moderate**

Source: Primary data, 2019

In the table 4.12, very high, high, moderate, low and very low extents of improvement in households' living standards can be identified, depending on the indicator and/or sub-indicators chosen, among cooperative members. The indicator with the highest extent is access to health services having a mean of 4.01. The sub-indicators under this indicator show extents ranging from very high with a mean of 4.43 for ability to pay for community-based health insurance for the family to moderate with a mean of 3.33 for improved family clothing. This was due to the fact that rice growers give priority the payment of health insurance cost once they get income from rice harvest.

Considering the descending order of the means, the findings reveal that indicators showing moderate include income, assets ownership and education with respective means of 3.13, 2.73 and 2.69. The sub-indicators under income signal that involvement in rice growing activities enabled cooperative members to increase the income to a high extent having a mean of 4.15 whereas the making of savings was moderate with a mean of 2.92 while the making of investment was low with a mean of 2.42. All sub-indicators of such indicators as assets ownership and education show moderate extents except acquisition of animals which shows a low extent with a mean of 2.42.

The only indicator with very low extent is housing. Apart from the sub-indicator of acquisition of certain equipments needed at home that has a moderate mean of 3.15, all other related sub-indicators show very low extent with means ranging from 1.12 to 1.78. This implies housing is given the last priority in relation to other indicators.

Summarily, the overall mean of 2.73 indicates a moderate improvement of households living standards. This conveys that involvement in rice growing activities have helped improve the household living standards of cooperative members moderately. What one can wander is if non-cooperative members too have the same or different experience. The following details focus on the findings about the case of non-cooperative members.

4.3.2 Improvement of households living standards among non-members

Presented in the table below are the results on how rice growing activities carried out in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone have helped improve households living standards of non-cooperative members.

Table 4.13: Extents of improvement of households living standards among non-members

Indicators	Mean	Interpretation
Education	**1.55**	**Very low**
Increased ability to pay for children' s school fees	1.75	Very low
Increased ability to buy school materials for my children	1.34	Very low
Health services	**3.02**	**Moderate**
Increased ability to pay for community-based health insurance for the family	3.53	High
Increased ability covers medical moderation ticket costs	3.02	Moderate
Improved family nutrition	2.82	Moderate
Improved family clothing	2.70	Moderate
Income	**2.93**	**Moderate**
Enabled to increase income	3.03	Moderate
Enabled to make savings	3.19	Moderate
Enabled to make other investments	2.56	Low
Assets ownership	**2,69**	**Moderate**
Enabled to buy certain equipments needed at my home	2.94	Moderate
Enabled to acquire domestic animals	2.44	Low
Housing	**1.79**	**Very low**
Enabled to build a house	1.63	Very low
Enabled to cement my house	2.16	Low
Made house expansion possible	2.31	Low
Made house electrification possible	1.34	Very low
Enabled to renew the house roof	1.53	Very low
IMPROVEMENT OF HOUSEHOLDS LIVING STANDARDS	**2.39**	**Low**

Source: Primary data, 2019

Findings in the table 4.12 indicate high, moderate, low and very low extents of improvement of households' living standards, depending on the indicator and/or sub-indicators considered, among non-cooperative members. Extents for all indicators are either moderate or very low. Listed according to the descending order of their means, indicators with moderate extents include health services, income and assets ownership with respective means of 3.02, 2.93 and 2.69. Obviously, non-cooperative members too give priority the payment of health insurance cost once they get income from rice harvest.

Except such a sub-indicator as increased ability to pay for community-based health insurance for the family that has high extent with a mean of 3.53, all other health services related sub-indicators show moderate extents with means ranging from 2.70 to 3.02. All income related sub-indicators show moderate mean apart from house expansion showing a low extent with a mean of 2.56. Under assets ownership, enablement to acquire certain equipments needed at my home shows moderate extent with a mean of 2.94 while enablement to acquire domestic animals shows low extent with a mean of 2.44.

The remaining indicators, being education and housing, show very low extents with respective means of 1.55 and 1.79. All education and housing related sub-indicators show very low means except the enablement to cement my house and the making of house electrification possible sub-indicators of housing that show low extents with respective means of 2.16 and 2.31.

In short, the overall mean of 2.39 indicates a low improvement in households living standards. This implies that the involvement in rice growing activities have helped improve the household living standards of cooperative members at low extent. This raises a concern to understand how involvement in rice growing activities has improved households living standards among both cooperative and non-cooperative members. Through comparative approach, the next details indicate how such a concern is dealt with.

4.3.3 Comparison of extent of improvement of households living standards

As the study involves rice growers belonging to two categories namely cooperative and non-cooperative members, a comparative approach was used so as to apprehend the difference between those two categories regarding how involvement in rice growing activities have helped improve the household living standards. The following table contains comparative information about the improvement of cooperative and non-cooperative members' households living standards.

Table 4.14: Compared extents of improvement of households living standards

Indicators	Coop. Members		Non-coop. members	
	Mean	Interpretation	Mean	Interpretation
Education	**2.69**	Moderate	**1.5**	**Very low**
Increased ability to pay for children' s school fees	2.46	Moderate	1.75	Very low
Increased ability to buy school materials for my children	2.92	Moderate	1.34	Very low
Health services	**4,01**	High	**3.02**	**Moderate**
Increased ability to pay for community-based health insurance for the family	4.43	Very high	1.63	Very low
Increased ability covers medical moderation ticket costs	4.11	High	4.44	Very high
Improved family nutrition	3.93	High	3.00	Moderate
Improved family clothing	3.33	Moderate	3.00	Moderate
Income	**3.13**	Moderate	**2.93**	**Moderate**
Enabled to increase income	4.15	High	3.03	Moderate
Enabled to make savings	2.92	Moderate	3.19	Moderate
Enabled to make other investments	2.33	Low	2.56	Low
Assets ownership	**2.73**	Moderate	**2,69**	**Moderate**
Enabled to buy certain equipments needed at my home	3.05	Moderate	2.94	Moderate
Enabled to acquire domestic animals	2.42	Low	2.44	Low
Housing	**1.48**	**Very low**	**1.79**	**Very low**
Enabled to build a house	3.15	Moderate	1.63	Very low
Enabled to cement my house because	1.78	Very low	2.16	Low
Made house expansion possible	1.30	Very low	2.31	Low
Made house electrification possible	1.77	Very low	1.34	Very low
Enabled to renew the house roof	1.12	Very low	1.53	Very low
IMPROVEMENT OF HOUSEHOLDS LIVING STANDARDS	**2.81**	**Moderate**	**2.39**	**Low**

Source: Primary data, 2019

The findings in the table 4.14 indicate that involvement in rice growing activities has helped improved the households living stands of cooperative and non-cooperative members at different extents. Whereas access to health serves has improved at high extent with a mean of 4.01 for cooperative members, it has improved at moderate extent with a mean of 3.02 for non-cooperative members. It is worth noting that both cooperative and non-cooperative members give priority the payment of health insurance cost once they get income from rice harvest.

Concerning income, improvement is at moderate extent with a mean of 3.13 for cooperative members while it is also at moderate extent but with lesser mean of 2.93 for non-cooperative members.

With regard to assets ownership, improvement is at moderate extent with a mean of 2.73 for cooperative members and it is also at a moderate extent yet with a slightly lesser mean of 2.69 for non-cooperative members.

Regarding education, improvement is at moderate extent with a mean of 2.69 for cooperative members whereas it is at very low extent with a mean of 1.55 for non-cooperative members.

For housing, improvement is at very low extent for both cooperative and non-cooperative members. However, the mean of 1.79 indicating very low extent for non-cooperative members is greater than the mean of 1.48 for cooperative members.

All being well considered, improvement of households living standards due to involvement in rice growing activities is better for cooperative members than for non-cooperative members. This is because the overall means indicate that the improvement is at moderate extent with a mean of 2.81 for cooperative members while it is at low level with a mean of 2.39 for non-cooperative members. Added to that, except for housing, all 4 indicators considered show extents of improvement in households living standards that are greater than for cooperative members than for non-cooperative members. This concurs with the previous findings that showed that cooperative members perform better in rice growing activities than non-cooperative members.

However, findings in the table 4.11 indicated that involvement in rice growing activities was at high extents with overall means of 3.83 and 3.80 for cooperative members and non-cooperative members respectively whereas findings in the table 4.14 showed that

improvement of households living standards was at moderate extent with a mean of 2.81 for cooperative members and at low extent with a mean of 2.39 for non-cooperative members. Comparing those figures signals a tangible gap between extents shown for cooperative members on one hand, and for non-cooperative members on the other hand under the two variables under study. Therefore, the research sought to determine the relationship between the two variables under study through correlation analysis.

4.4 RELATIONSHIPS BETWEEN INDEPENDENT AND DEPENDENT VARIABLES

The third objective of the current study is to determine how involvement in rice growing activities correlates with improvement of households living standards of cooperative and non-cooperative members operating in JYAMBERE MUHINZI WA HUYE cooperative rice growing zone. Achieving this objective required the research to discriminate between independent and dependent variables of the study. The independent variable is stated as "involvement in rice growing cooperative activities" whereas the dependent variable is stated as "improvement of households living standards".

Although the study was mainly focusing on cooperatives, a comparative study was conducted comparing both the case of cooperative members and the case of non-cooperative members. Therefore, the relationship is determined separately for the sake of comparison.

4.4.1 Relationships between independent and dependent variables for members

The tablebelow is intended to show the relationship between involvement in rice growing cooperative activities and improvement of households living standards for cooperative members.

Table 4.15: Correlation analysis of variables for non-cooperative members

		Involvement in rice growing cooperative activities	Improvement of households living standards
Involvement in rice growing cooperative activities	Pearson Correlation	1	,838**
	Sig. (2-tailed)		.000
	N	175	175
Improvement of households living standards	Pearson Correlation	.838**	1
	Sig. (2-tailed)	.000	
	N	175	175

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

Source: Primary data, 2019

The table 4.15 indicates 0.838 as the Pearson's correlation coefficient. This implies a significant relationship between the two variables. The level of significance of 0.000 can also be noted. Since this level is less than 0.05, the hypothesis stating that there is a significant relationship between the involvement in rice growing activities among cooperative members and the improvement of households living standards of the very same members is confirmed. This causes the rejection of the null hypothesis. This implies that improving the involvement in rice growing activities can lead to improvement in households living standards for cooperative members.

4.4.2 Relationships between independent and dependent variables for non-members

Provided below is the table showing the relationship between involvement in rice growing cooperative activities and improvement of households living standards for non-cooperative members.

Table 4. 16: Correlation analysis of variables for non-cooperative members

		Involvement in rice growing cooperative activities	Improvement of households living standards
Involvement in rice growing cooperative activities	Pearson Correlation	1	.932**
	Sig. (2-tailed)		,000
	N	32	32
Improvement of households living standards	Pearson Correlation	.932**	1
	Sig. (2-tailed)	,000	
	N	32	32

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

Source: Primary data, 2019

The table 4.16 indicates the Pearson's correlation coefficient of 0.932 implying a significant relationship between the two variables. The level of significance of 0.000 is also noticeable. As this level is less than 0.05, the hypothesis stating that there is a significant relationship between the involvement in rice growing activities among non-cooperative members and the improvement of households living standards of the very same non-cooperative members is retained. Consequently, the null hypothesis is rejected. This means that improving the involvement in rice growing activities can lead to improvement in households living standards for non-cooperative members.

4.4.3 Comparison of the relationships between variables

The table 4.15 indicates 0.838 as the Pearson's correlation coefficient for the relationship of the variable in the case of cooperative members whereas the table 4.16 indicates the Pearson's correlation coefficient of 0.932 for the relationship of the variable in the case of cooperative members. Although the levels of significance indicated significant relationship between the study variables in both cases, Pearson's correlation in the case of non-cooperative members is greater than Pearson's correlation in the case of non-cooperative members. This implies that the correlation of data collected from non-cooperative members is stronger than the correlation of data collected from cooperative members.

4.5 SUGGESTIONS FOR IMPROVING THE CURRENT SITUATION OF RICE-GROWERS

An open question was asked to the respondents to suggest what can be done to improve their current situation. The responses given by those respondents are summarized in the table below.

Table 4.17: Suggestions from respondents

Responses	Coop. members		Non-coop. members		Total	
	Frequency	%	Frequency	%	Frequency	%
Increasing the price	135	77.14	14	43.75	149	71.98
Being given cows for making organic fertilizer	90	51.43	17	53.13	107	51.69
Being given more land	64	35.70	26	81.52	90	43.48
Being given loans	112	64.00	23	71.88	135	65.22
Permission to sell their harvest by themselves	131	74.86		0.00	131	63.29
Quick collection of their claims on their behalf	122	69.71		0.00	122	58.94
Reduction of amount withheld at source	125	71.43		0.00	125	60.39
Use of more efficient milling machines	119	68.00		0.00	119	57.49
Reduction of prices of fertilizers	45	25.71		0.00	45	21.74
Permission to consume their harvest	52	29.71		0.00	52	25.12
Training for all members and not for some	43	24.57		0.00	43	20.77
Timely carrying out of rice growing activities	61	34.86	11	18.75	72	34.78
Access to assistance related to fertilizers		0.00	21	65.63	21	10.14

Source: Primary data, 2019

From the table 4.17, it can be noted that some the suggestions are common to both cooperative and non-cooperative members whereas others are uncommon. Regarding common suggestions, the highest numbers of respondents representing 71.98% find unsatisfactory the price paid to them for their harvest. They therefore suggest that it should be increased. The next highest number of respondents representing 65.22% find access to loan very helpful for improving the outcome of their current their rice growing activities. Being given cows for the sake of making organic fertilizer was suggested by 51.69 of the respondents as they think that such fertilizer can help increase the yield of exploited land. Being given more land was suggested by respondents representing 43.48% since they

consider that the larger the land size exploited the more the income one can earn. As some have agreed that they sometimes carry out certain rice growing activities untimely, 34.78% of the respondents suggest timely carrying out of those activities.

Among suggestions particular to cooperative members, the permission to sell their harvest by themselves was suggested by 74.86% of the respondents from cooperative members while respondents representing 71.43%, 69.71%, 68.00% respectively suggested the reduction of amount withheld, quick collection of claims by the cooperative on behalf of the members and the use of more efficient milling machines that can help reduce wastes. Though not suggested by the majority of respondents, Reduction of prices of fertilizers, permission to consume their harvest and training for all members and not for some are other suggestions from cooperative members. The only suggestion unique for non-cooperative members suggested by 65.63% of respondents from non-cooperative members isto be given the same assistance given to cooperative members regarding reduced prices of chemical fertilizers. This suggestion is based on the fact that cooperative members buy chemical fertilizers at lower prices than non-cooperative members.

4.6 SUMMARY OF CHAPTER FOUR

In this chapter, data have been presented in tabular forms, analysed and interpreted by the researcher. The extents of involvement in rice growing activities prove to be high for both cooperative and non-cooperative members and were slightly different considering the corresponding means. Whereas the extent of improvement of households living standards was proven moderate, it was fond low for non-cooperative members. Despite the mismatch between the extents shown for the variables for both the case of cooperative members and the case of non-cooperative members, significant relationships between involvement in rice growing activities and improvement of households living standards were identified under both cases. Some of the reasons that can be help justify the reason behind moderate and low improvement in households living standards of rice growers have been given by the respondents. What needs to be done is to take into consideration the concerns raised by the respondents so as to improve the extent of involvement in rice growing activities in order to improve the current level of households living standards of both cooperative and non-cooperative members.

CHAPTER FIVE: SUMMARY AND DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

This chapter deals with the summary, conclusion and recommendations in relation to the findings. Areas for further research are also suggested.

5.1 SUMMARY

This section is a recapitulation of the content of this thesis from chapter one to chapter four. In the introductory chapter, one can note that the current study, entitled "Involvement in Agricultural Cooperative Activities and Improvement of Living Standards in Rural Areas: A Comparative Study of Members and Non-Members Operating in JYAMBERE MUHINZI WA HUYE Cooperative Rice-Growing Zone in Huye District, was intended to investigate how involvement in rice growing activities has impacted on the improvement of households living standards of both cooperative and non-cooperative members operating in the zone considered.

The literature review helped to identify the gaps of knowledge in the literature about the topic of research. It provides operational definitions of key concepts which include cooperatives, agricultural cooperatives, household and living standards. It dealt with the relationship between involvement agricultural activities and households living standards improvement as it has been demonstrated in the previous researches. It showed what other related studies have found out and led to the conclusion that there is no prior comprehensive research that has been conducted in Rwanda to investigate how involvement in rice growing activities has impacted on the improvement of households living standards of both cooperative and non-cooperative members operating in the zone considered.

The methodology used indicates that the study adopted a cross sectional design combined survey design. Data ware obtained from both primary and secondary sources. A sample of 207 respondents was randomly selected from a population of 364 rice growers. The sample was stratified into 175 respondents selected for 320 cooperative members and 32 respondents selected from 34 non-cooperative members. Data collected using a questionnaire filled in by cooperative and non-cooperative members were analyzed using SPSS and excel software. The techniques of analysis used include descriptive and correlation analysis.

The chapter dealing with data analysis and interpretation contains major findings of the study

which are summarized here below considering its main sections.

Profile of the respondents

Findings about gender revealed that females involved in rice growing activities in zone under study have by far in greater percentages. For cooperative members, females and males represent 88.57% and 11.43% respectively while they represent 78.12.% and 21.88% respectively among non-cooperative members. These findings concur with Giagnicavi (2012) and Gibson (2005) who argued that home and agricultural activities and put it that cooperatives strengthen the socio-economic empowerment of marginalized women populations considered as the engines of development. The majority of respondents with a percentage of 59.9% are married. Respondents aged above 35 represent 73.43. The majority of respondents representing 78.74% primary educational level whereas respondents who did not attend school represent 14.49%. It was found out that 87.92% of all respondents have a rice growing experience of not less than 3 years. The highest percentage of 47.34% of rice growers cultivating land of 5 acres each. Those with the largest size of cultivated land of 20 acres are in the smallest number and represent 6.28%.

Findings showed that 83.58% of respondents earn an income less than Rwf30,000 per month. The remaining percentage is for rice growers earning a monthly income that is greater than Rwf30,000. It is worth noting that all those who earn more the Rwf30,000 are only cooperative members. These findings agree with Somavia (2002) who put it that agricultural cooperatives can assist households through the creation of decent jobs and income generation through resource mobilization. Whereas the highest number of all respondents with a percentage of 56.04% have no savings, 40.58% of all respondents have current savings of less than Rwf100,000 from rice growing activities.

Involvement in rice growing activities

Under this heading, findings indicated a high extent of cooperative members' involvement in rice growing activities with an overall mean of 3.95. Yet some indicators have shown very high extent. These include quality seed selection and land preparation which had a mean of 5.00 and water use and management with a mean of 4.66. For non-cooperative members the high extent of involvement in rice growing activities with an overall mean of 3.80 was noted. The only indicator that showed very high extent was quality seed selection and land

preparation which had a mean a mean of 4.83. It was noted that the overall extent of cooperative members' involvement in rice growing activities is greater than that of non-cooperative members.

All the facts indicated above convey the idea that cooperative members carry out rice growing activities better than non-cooperative members do. This might be due to the fact that cooperative members benefit from facilities and extension services that they get through their cooperative. This agrees with (Zhang-Y. Z, 2004; Benjamin and Brandt, 2002, ECORD ,2012; Wanyama, 2014; and BRRI,2015) who argued agricultural cooperatives facilitate access to fertilizers and other inputs, transport means, both processing and storage facilities and facilitate the marketing of products at specific prices. Cooperative members' involvement extent in rice-growing activities that is higher than that of non-cooperative members imply that the former are prone to achieve better households living standards than the latter. Therefore, the study had to examine the extent of households living standards for both cooperative and non-cooperative members and related results are discussed here below.

Improvement of households living standards among members

Findings under this heading revealed a moderate extent of improvement of households living standards with an overall mean of 2.73 for cooperative members whereas a low extent of improvement of households living standards with an overall mean of 2.33 for non-cooperative members was found out. This suggests that there is need to rice growing activities alone have not sufficiently helped improve households living standards of both cooperative and non-cooperative members.

Despite the extents of households living standards that sound somehow unsatisfactory, the extents of households living standards among cooperative members proves to be better than the one found among non-cooperative members. Such findings line up with TFC (2006) who put it that cooperatives, in general, help improve people's economic prospects as they can constitute a part of the programme leading to reduce poverty. Moreover, they line up with FAO (2011) in its argument that agricultural cooperatives, by creating sustainable rural development through employment and income creation, help support small agricultural producers belonging to specific household. This implies that it is better for small holder farmers to carry out rice-growing activities through cooperative than doing it otherwise.

Relationships between the study variables

The relationships between the independent variable stated as "involvement in rice growing activities" and the dependent variable stated as "improvement of households living standards" was determined and analyzed considering cooperative members and non-cooperative members separately. For the case of cooperative members, a Pearson's correlation coefficient of 0.838 was found and the level of significance of 0.000 was also found. As this level is less than 0.05, it meant a significant relationship between the two variables. Regarding the case of non-cooperative members, a Pearson's correlation coefficient of 0.932 was found and the level of significance proved to be 0.000. Since this level is less than 0.05, it implied a significant relationship between the two variables. Consequently, the researcher was enabled to confirm alternative hypothesis and to reject null hypothesis.

Suggestions for improving the current situation of rice-growers

An examination of suggestions by the respondents about what can be done for the improving their current situation was carried out. The major suggestions common for both cooperative and non-cooperative members include the increasing of the price at which rice harvest is sold, being given cows for making organic fertilizer and being given loans. The main suggestions for specific to cooperative members include being given the permission to sell their harvest by themselves, quick collection of their claims by the cooperative on their behalf, the reduction of amount withheld at source and the use of more efficient milling machines. One suggestion particular to non-cooperative members was be given the same assistance given to cooperative members regarding reduced prices of chemical fertilizers.

5.2 CONCLUSION

The current study was undertaken to investigate how involvement in agricultural cooperative activities has improved households living standards among cooperative and non-cooperative members operating in Operating in JYAMBERE MUHINZI WA HUYE Cooperative Rice-Growing Zone in Huye District. The relevant literature review was done considering the study objectives and conceptual framework. For methodology, cross-sectional and survey designs were adopted. The sampling procedure of stratified random sampling was used. Data were collected, from both primary and secondary, using a questionnaire and analyzed using SPSS and excel software. The measurement of variables relied on 4 points Likert-scale. Descriptive

analysis and correlation analysis were opted for as techniques of analysis.

The findings revealed high extents of involvement in rice growing activities for both cooperative and non-cooperative members. However, the extent of involvement in rice growing activities proved to be higher among cooperative members than among non-cooperative members. This implies that cooperative members were carrying out rice growing activities better than non-cooperative members. Other things being equal, it is better to carry out agricultural, especially rice growing, activities in cooperatives than carrying them on one's own. These findings show that the first specific objective was achieved and the related specific research question was answered.

The examination of the extent to which involvement in rice growing activities has improved households living standards was done. The findings indicated that involvement in rice growing activities has improved households living standards among cooperative members to a moderate extent whereas the extent of improvement was found low among non-cooperative members. Consequently, it can be inferred that involvement in rice growing activities has improved households living standards among cooperative members than among non-cooperative members though the extents of improvement show that there still tangible need for better extents than the current ones. This enable to infer that, other things being equal, it is better to carry out agricultural, especially rice growing, activities in cooperatives than carrying them on one's own. Such findings show that the second specific objective was achieved and related specific research question was answered.

Correlation analysis proved that there exists a significant relationship between the involvement in rice growing activities among cooperative members and the improvement of households living standards of the very same members. A significant relationship between the involvement in rice growing activities among non-cooperative members and the improvement of households living standards of the very same non-cooperative members was found existing as well. This implies that, other things being equal, for improving the households living standards either for cooperative members or for non-cooperative members, it is necessary to ensure that agricultural activities, especially rice growing activities, are carried out in due manner. One of the strategies that can be used proves to be the formation of well-functioning agricultural cooperatives. Failure to ensure the best extent of involvement in agricultural activities will handicap the improvement of house living standards of those carrying out

agricultural activities and affect negatively the overall development of the country. Such findings show that the third specific objective was achieved and related specific research question was answered.

5.3 RECOMMENDATIONS

The fourth objective of the study is to make recommendations to susceptible to help improve the current scenario. Recommendations are addressed to the key stakeholders indicated in the details below:

To Government:

- Although the extents of involvement were found high for both cooperative and non-cooperative members, they need to be very high or full. The government should then, through their agricultural official, make follow-up to ensure that the best and modern rice growing practices are adequately implemented by rice growers.

- Through the Ministry of Agriculture and its other institutions such as Rwanda Cooperative Agency (RCA) should work together to ensure agricultural cooperatives are managed efficiently. This will put farmers, including rice growers, in better position to receive in fully and in due manner any extension services from the government and put them to their best use.
- Majority of the respondents consider the deductions made at source need to be reduced as they affect negatively their income for rice harvest. The government should investigate if the deductions at source are still necessary and consider if they can be removed. In case they found necessary, the government should make sure they are fair enough for the moment.
- As some respondents expressed the need for cows for making organic fertilizers, the government should make sure the rice growers considered under the current study benefit from GIRINKA program.

To the cooperative members:

- Even though the extent of involvement proved to be high, it needs to very high and even full. Therefore, they should ensure they seek for advice, on timely basis, from qualified government officials with the responsibility to assist them and to carry out their activities in accordance with the guidelines so as to benefit from their expertise.

- Some the respondents indicated untimely carrying out of certain activities: Rice growers should ensure they carry out rice growing activities on a timely basis since this can be beneficial to them as delays affect negatively agricultural harvest.

To cooperative managers:

- Some respondent raised concern about delay in collection of their claims. Cooperative managers need to approach cooperative members' harvest buyers and discuss ways of quickening the collection of those members' claims.
- They should consider reminding the rice growers to carry out rice growing activities at the right time since they are in a position to follow up the activities being carried out in the cooperative zone.

5.4. AREAS FOR FURTHER RESEARCH

Other studies covering other factors and taking wider scope are needed. Specifically, further research is needed in the following areas:

- The same study can be undertaken considering the entire district, the entire southern province or nationwide
- The same study can be undertaken considering crops other than rice
- There need to investigating factors causing differences in the extents noted among cooperative and non-cooperative members under the study variables.
- There is need to investigate the link between the cost incurred and the revenue earned by rice growers in the very same zone.

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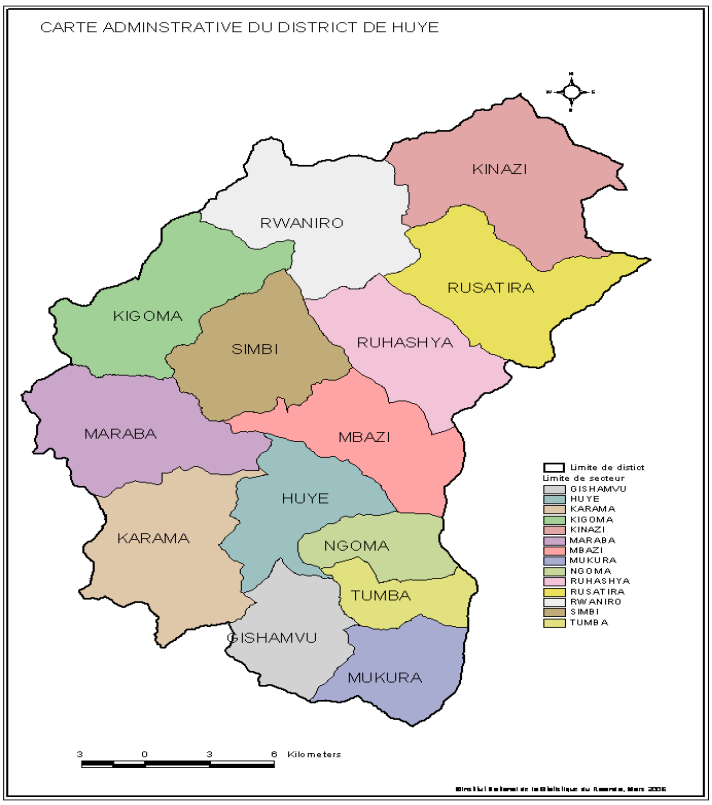
APPENDICES

APPENDIX I: STUDY AREA



*Source:*https://www.google.rw, Accessed on January 15th, 2021.

APPENDIX II: TABLE FOR DETERMINING THE RANDOM SAMPLE SIZE FROM A DETERMINED POPULATION

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2,800	338
15	14	110	86	290	165	850	265	3,000	341
20	19	120	92	300	169	900	269	3,500	346
25	24	130	97	320	175	950	274	4,000	351
30	28	140	103	340	181	1,000	278	4,500	354
35	32	150	108	360	186	1,100	285	5,000	357
40	36	160	113	380	191	1,200	291	6,000	361
45	40	170	118	400	196	1,300	297	7,000	364
50	44	180	123	420	201	1,400	302	8,000	367
55	48	190	127	440	205	1,500	306	9,000	368
60	52	200	132	460	210	1,600	310	10,000	370
65	56	210	136	480	214	1,700	313	15,000	375
70	59	220	140	500	217	1,800	317	20,000	377
75	63	230	144	550	226	1,900	320	30,000	379
80	66	240	148	600	234	2,000	322	40,000	380
85	70	250	152	650	242	2,200	327	50,000	381
90	73	260	155	700	248	2,400	331	75,000	382
95	76	270	159	750	254	2,600	335	1,000,000	384

Derived from: Krejcie, R. V., & Morgan, D.W. (1970), Determining sample size for research activities, *Educational and Psychological Measurement*, 30,607-610

APPENDIX II: QUESTIONNAIRE

1. QUESTIONNAIRE FOR RESPONDENTS

Dear respondent,

A study on "**Involvement in Agricultural Cooperative Activities and Improvement of Living Standards in Rural Areas: A Case Study of JYAMBERE MUHINZI WA HUYE Rice-Growing Cooperative**"is conducted to better ascertain a relationship between agricultural marketing cooperative practices' effectiveness and the members' households living standards raising considering JYAMBERE MUHINZI Cooperative Zone in Huye District as a case study. Collected data will be processed and analyzed with due confidentiality.

I kindly request you to respond to the following questions and thank you so much for your invaluable time you spend providing me with helpful information.

A. Demographic Information:

1. Gender: Female: ☐ Male: ☐
2. Age : 18 – 25: ☐ 26 – 35: ☐ 36 – 45: ☐ 46 – 55: ☐ Over 55: ☐
3. Level of education:
4. Primary School and Lower: ☐ Secondary School: ☐ Undergraduate ☐
   Other, please specify.....
5. Duration in tea cultivation:
   Less than 1 year: ☐ 1 – 2 years ☐ 2 – 3 years: ☐ 3 – 4 years: ☐
   4 – 5 years: ☐ Over 5 years: ☐
6. What is the size of your exploited land in term of acres?.....
7. Please tick for the range corresponding to you Monthly income from tea-related activites:
   Not more than 30,000 ☐ 30,000-60,000 ☐ 60,000-90,000 ☐ 90,000-120,000-150,000 ☐ 150,000-180,000 ☐ 180,000-210,000 ☐ Other range, please s☐fy: .....
8. Please tick the range corresponding to you current savings from tea-related activites:
   Not more than 100,000 ☐ 100,000-200,000 ☐ 200,000-300,000 ☐ 300,000-400,000 40☐0-500,000 No☐ Other range, plea☐pecify: .....

B. ABOUT INVOLEMENT IN RICE GROWING COOPERATIVE ACTIVITIES

Please tick the scale after considering the corresponding the statement:

The scales range from strongly Disagree (1) to Strongly Agree (5)

	Statements	**1**	**2**	**3**	**4**	**5**
	Quality Seed selection and land preparation					
	I always choose good quality seed before cropping					
	I always choose seed of a suitable variety of rice that suit the cropping environment					
	I dig-up the soil properly before mixing the soil for seed planting					
	I mix the soil properly before planting the seed					
	I make sure the land is adequately leveled before I plant the seed					
	Crop establishment					
	I pre-germinate the seedlings in the seed bed on a timely basis					
	I rely on transplanting the pre-germinated seedlings from seed-bed to wet field					
	I rely on direct seedling in my rice cropping activities					
	Water use and management					
	I always ensure there is sufficient water in the rice field					
	I conserve sufficient water to be used in case of water scarcity					
	I dry my crop field on a timely basis					
	Use of fertilizers					
	I rely on the conservation of soil inorganic fertilizers to increase the yields					
	I rely on chemical fertilizers to increase the yields					
	I rely on both inorganic fertilizers and chemical fertilizers to increase the yields					
	I rely more on inorganic fertilizers and less on chemical fertilizers to increase the yields					
	Harvest and after harvest activities					
	I do the cutting, stocking, handling, threshing, cleaning, and hauling manually.					

	I do the cutting, stacking, handling, threshing, cleaning, and hauling mechanically.					
	I carry some of the harvesting activities manually and some others mechanically					
	I sell my harvest after drying it					
	I sell my harvest after milling it					

C. ABOUT THE IMPROVEMENT OF HOUSEHOLDS LIVING STANDARDS

Please tick the scale after considering the corresponding the statement:

The scales range from Strongly Disagree (1) to Strongly Agree (5)

	Statements	**1**	**2**	**3**	**4**	**5**
	Education					
	My involvement in rice-growing activities has enabled me to increase my ability to pay for my children' s school fees					
	My ability to buy school materials for my children has increased owing to my involvement in rice-growing activities					
	Access to health services					
	My ability to pay for community-based health insurance for the family has increased through my involvement in rice-growing activities					
	My involvement in rice-growing activities has increased my ability to cover medical moderation ticket costs					
	My family nutrition has improved owing to my involvement in rice-growing activities					
	The clothing for my family has improved because of my involvement in rice-growing activities					
	Income					
	I have been able to increase my income through my involvement in rice-growing activities					
	My involvement in rice-growing activities has enabled me to make savings					

	My involvement in rice-growing activities has enabled me to make other investments					
	Assets ownership					
	Because of my involvement in rice-growing activities, I have been able to buy certain equipments needed at my home					
	I have been enabled to acquire domestic animals due to my involvement in rice-growing activities					
	Housing					
	My involvement in rice-growing activities has enabled me to build a house					
	I have been able to cement my house because of my involvement in rice-growing activities					
	I have relied on my tea-related agricultural activities to expand my house					
	I have relied on my tea-related agricultural activities to electrify my house					
	My tea-related agricultural activities have enabled me to renew the roof of my house					

C: OPEN QUESTION

What do think can be done for your involvement in rice growing activities help you improve you current living standard?

……

……

……

……

Thank you very much