



COLLEGE OF ARTS AND SOCIAL SCIENCES (CASS)

CENTER FOR CONFLICT MANAGEMENT (CCM)

MASTERS IN PEACE STUDIES AND CONFLICT

TRANSFORMATION

**THE CONTRIBUTION OF FISHING COOPERATIVES AND FOOD SECURITY IN
RWANDA:**

THE CASE OF “COOPPAVI” IN RUBAVU DISTRICT

Thesis submitted to the College of Arts and Social Sciences in partial fulfillment of the requirement for the Award of a Masters’ Degree in Peace Studies and Conflicts Transformation.

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MUSANZE, MAY 2020

DECLARATION

To the best of my knowledge, I CSP KANYAMIHIGO RUTAGARAMA, declare that this dissertation is my authentic work. It is being submitted at the University of Rwanda for the fulfillment of the requirement for the Award of a Masters' Degree in Peace Studies and Conflicts Transformation. It has not been presented in any other Institution of Higher Learning for any degree or examination. Where other's works have been used, they have been acknowledged in the reference list.

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DEDICATION

I dedicate this thesis to my dear wife, SHYASHARI Gentile, my favorite children MIHIGO Nicia, MIHIGO Gift MIHIGO Nici, MIHIGO Gina, my mother NYIRABIRUTWA my relatives, GAFEREGE MUDAHAKANA, NSANZABANDI Charles NDORI RANGO, MUNANA Aloys, KANAKUZE RUTEKERE, TWIZERE Jacques, and KAJONI RUSIBANA.

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ABBREVIATIONS AND ACRONYMS

BCEOM: Bureau Central d'Etudes pour les Equipements d'Outre Mer

COOPPAVI: Coopérative pour la Promotion de Pêche et des Activités de Vente d'Isambaza/
Cooperative for the Promotion of Fishing and Commerce Activities of Isambaza

CFS: Committee on World Food Security

CIDA: The Canadian International Development Agency

Dr.: Doctor

EAC: East African Community

EICV: Enquête Intégrale sur les Conditions de Vie des ménages/ Integrated Household Living
Conditions Survey (IHLCS)

Et al.: *Et alia* (and others)

FAO: Food and Agriculture Organization

FGD: Focus Group Discussion

FNS: Food and Nutrition Security

GDP: Gross Domestic Product

HIV/AIDS: Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome

HLPE: High Level Panel of Experts on Food Security and Nutrition

ICA: International Cooperative Alliance

ILO: International Labour Organization

MINAGRI: Ministry of Agriculture and Animal Resources

MINICOM: Ministry of Trade and Industry

NISR: National Institute of Statistics of Rwanda

NSW: New South Wales

P: Page

PAIGELAC: Projet d'appui à l'aménagement intégré et à la gestion des lacs intérieurs
(*PAIGELAC*) / Inland Lakes Integrated Development and Management Support
Project

RAB: Rwanda Agriculture and Animal Resources Development Board

RCA: Rwanda Cooperative Agency

RCFSVANS: Rwanda Comprehensive Food Security and Vulnerability Analysis and Nutrition
Survey

UN: United Nations

UNDP: United Nations Development Programme

USD/ US\$: United States Dollar

WFP: World Food Program

WHO: World Health Organization

ABSTRACT

This study explored the contribution of fishing cooperatives on food security: The case of “COOPPAVI” operating in Rubavu District, Western Province of Rwanda. The underlying concern is as follows: Faced with the prevalent food security problems, Rwanda initiated different fishing cooperative interventions engaging community to resolve food security challenges. Basic need theory was used to explain how food security is a basic need to all human beings. This study followed a qualitative research design; interview and focus group discussion using interview guide questions were administered to 93 respondents selected by using purposive sampling strategy. The research findings established the contribution of fishing cooperatives on food security in Rubavu District. In this regard, fishing cooperatives conduct different activities (fish production, processing and trade) to improve food security and welfare of the cooperative members and the population countrywide and neighboring countries. In addition, the findings disclosed that the level of food availability and accessibility was relatively effective. Food utilization was reportedly satisfied. The findings disclosed that in Rubavu District the population recognized the good quality of fresh and processed fishes. However, the study findings disclosed the poor storage condition and preparation of fishes at homes. The findings disclosed unpredictable food (fish) stability in Rubavu District due to temporary and seasonal food insecurity threats (unfavorable weather conditions and clandestine illegal fishing). Nevertheless, the research findings identified the different challenge hindering COOPPAVI to effectively run fishery activities and improve food security: insufficient capital to run the cooperative business, insufficient and inappropriate equipment of fishing, subsistence and artisanal fishing practices, people illegal fishing and fishing malpractices, lack of international and national enforcement policy supporting the implementation of the different food security dimensions (food availability, accessibility, utilization and food security stability. Given these challenges, the research findings suggested to take into consideration different policies, interventions and financial support in order to improve food security and nutrition.

Key words: Fishing cooperative, food security

CHAPTER I: GENERAL INTRODUCTION

I.1. Introduction

The World Food Summit of 1996 indicated that food security exists when all people at all times have access to sufficient, safe, nutritious food, which gives them ability to maintain a healthy and active life. Commonly, the concept of food security includes both physical and economic access to food (WHO, 2014). Subsequently, the food insecurity causes different socio-economic, cultural and political problems in community. Scholars (Geoffrey L. and Kristen L., 2010, p.45) argue that prior the global financial crisis became extremely visible in late 2008; the crisis in food was already present. Stepping up food prices, together with increasing numbers of low-income families dropping below the poverty line in the developing world, led to civil unrest as people demanded access to affordable food. A clear example of this challenge is Indonesia in 1997/98 when the chaotic development in various currencies and the food riots occurred in several urban areas (Uwe K. and Manfred S., 2014, p. 11).

In Africa, food issues remain a considerable barrier to greater regional security, growth and prosperity. Over twenty seven million people in the greater region experience food shortage and require humanitarian assistance, a 39 percent increase in food insecurity over 2016 (FAO, 2016).

In Rwanda, two different consecutive studies conducted by the Ministry of Agriculture (MINAGRI) in partnership with the World Food Program (WFP) in 2009 and 2012 revealed that the food security status within this period was generally good, in spite of few cases of food insecurity reported countrywide. Accordingly, the study conducted by the *Rwanda Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey* (RCFSVANS, 2017) pointed out that 4.2 percent of the households are insufficient food consumption, 17.3 percent have borderline food consumption, and 78.5 percent have satisfactory food consumption (NISR and World Food Programme, 2014, p. 12). In addition, the national survey carried out in 2012 disclosed that in the 12 months before the survey, 51 percent of households had faced difficulty in accessing enough food. This included people who had experienced either re-occurring regular problems accessing enough food, unusual acute problems accessing enough food, or chronic problems accessing enough food for most of the year (MINAGRI NISR and WFP, RCFSVANS, 2012).

In order to mitigate the consequences of food insecurity, different meetings were organized worldwide, which saw a sharp rise in political attention to food insecurity challenges and related social problems. Among them are the Summit-level meeting of World Summit for Children (1990), the UN Conference on the Environment and Development (1992), the World Population Conference (1994), and the World Food Summit. These events, together with an improved understanding of the nature and causes of, and solution to, food and hunger problems, new technological prospects, notably in biotechnology, and with growing emphasis on the ethical and human rights dimension of development, gave rise to hope for accelerated progress in overcoming hunger (Uwe K. and Manfred S., 2012). Thanks to these efforts, different mechanisms put in place to eliminate food insecurity are numerous in different sectors.

These interventions include fishing cooperatives in addressing issues of food insecurities. Accordingly, the Food and Agriculture Organization of the United Nations (FAO, 2011) considers the fishing cooperatives as a critical sector helping to achieving food security, ending hunger and reducing poverty in different countries. Fisheries and aquaculture sectors are greater than ever becoming socially and economically crucial to eradicate the food insecurity (Swartz et al. 2010). Fishes are the most and broadly traded of food commodities with 38% of all recorded fishery production traded across national borders, and about 50% coming from emergent countries (Food and Agriculture Organization of the United Nations: FAO, 2011). FAO estimates 2.9 billion of people who rely on fish for a substantial part (greater than 20%) of their animal protein. In several African and Asian countries, fish provide more than half of the animal protein supply and are a food fastener (FAO, 2011). Sub-Saharan Africa is endowed with substantial marine and inland fisheries resources, and regional fisheries have developed significantly over the last thirty years (FAO, 2016)

In Rwanda the Rwanda Cooperative Agency (2018) indicates that the fishing is practiced in 24 lakes by 94 fishing cooperatives comprising 4620 members (Males: 3540 equivalent to 77% and females: 1080 corresponding to 23%). In general, the overall countrywide fish production is estimated at 13,000 tons. From these tons, capture fisheries contribute 9,000 tons and the rest 4,000 tons are produced by aquaculture (Rwanda Agriculture and Animal Resources Development Board: RAB, 2020). Fisheries and Aquaculture sectors offer practically 200,000

jobs though it is not a traditional enterprise (Mwanja et al. 2011). In 2009, the fisheries sub-sector contribution to the Gross Domestic Product: GDP is 0.33% (MINAGRI, 2019).

Similar to other Sub-Saharan countries, Rwanda has had food insecurity as one among the human security threats. Cooperatives are among its strategies for addressing post-genocide challenges, including food insecurity. With this regard, this country has seen its number of fishing cooperatives increase from 919 in 2005 to 8,995 in March 2018 with 3,816,591 registered members (Fourth Rwanda population and housing census, 2012). Particularly in 2019, this number of cooperatives increased considerably and reached 9,597 **cooperatives counting over five million members comprising over 2.69 million men, and over 2.14 million women (Rwanda Cooperative Agency: RCA report, 2019)**. Among this number of cooperatives, the Western Province has the highest number of registered cooperatives, that is, 24.9% of both financial and non-financial cooperatives, followed by Kigali City having 14.3% of cooperative organizations. Referring to business activities, the agricultural sector has the highest number of registered cooperatives (27% of all cooperatives) as well as the highest number of people (297,996 farmers) operating with cooperatives (**RCA report, 2019**).

There are 94 fishing cooperatives in Rwanda, and they comprise 4620 members (Males: 3540, corresponding to 77% and Females: 1080 equivalent to 23%). This figure covers only one percent of the total number of cooperatives registered in Rwanda (MINAGRI, 2020). Generally, the Western Province counts for 49 fishing cooperatives comprising 1880 members (Males: 1423, Females: 457). The fisheries sector is believed to be a most important contributor to food supplies and employment as well as a significant foreign exchange earner (FAO, 2014). In spite of this important contribution, they have not been much interest in contextualized studies that show the contribution of fishing cooperative in addressing food insecurity, which has inspired the interest of this research.

I.2. Statement of the problem

This study looks at the contribution of fishing cooperatives in addressing issues of food insecurities in Rwanda. Fishing cooperatives are seen as important in providing food security. They are critical to achieving food security, ending hunger and reducing poverty in different countries. Fishes are the most and widely traded of food commodities with 38% of all recorded fishery production traded across national borders, and about 50% coming from developing

countries (Food and Agriculture Organization of the United Nations: FAO, 2011). FAO projects that 2.9 billion of people rely on fish for a substantial part (greater than 20%) of their animal protein. In numerous African and Asian countries, fish production exceeds half of the animal protein supply and are a food staple (FAO, 2011).

Cooperatives form a framework helping to reduce poverty, to increase employment, and to empower marginalized groups in developing countries (Koffi Annan, 2011). The World Summit for social Development (1995) and the United Nations General Assembly resolution (1996) recognize the importance of cooperatives in the people-centered approach to social development (Hansen et al., 2011). In this context, different countries try hard for a comprehensive twin-track approach to food security that consists of: (1) direct action to immediately tackle hunger for the most vulnerable and (2) medium and long-term sustainable food security, nutrition programmes to eliminate the root causes of hunger and poverty, including through the progressive realization of the right to adequate food (World Summit on Food Security, 2012).

In Rwanda, the Rwanda Cooperative Agency (2018) indicates that the fishing is practiced in 24 lakes by 94 fishing cooperatives comprising 4620 members (Males: 3540 equivalent to 77% and females: 1080 corresponding to 23%). Generally, the national fish production is estimated at 13,000 tons of which capture fisheries contribute 9,000 tons and aquaculture 4,000 tons (Rwanda Agriculture and Animal Resources Development Board: RAB, 2020). Fisheries and Aquaculture sectors grant about 200,000 jobs though it is not a traditional project (Mwanja et al. 2011). In 2009, the fisheries sub-sector contributed 0.33% to the GDP (MINAGRI, 2019).

However, despite the belief that fishing cooperatives contribute to food security worldwide in general and in Rwanda particularly, different studies have underlined the persistence of an unacceptable high level of hunger and malnutrition worldwide that presents a serious challenge to the world at the threshold of the third millennium (Uwe k., Manfred S., 2012, p.1). The Food and Agriculture Organization (FAO, 2019) made an estimation of more than 820 million people in the world who are hungry, underscoring the colossal challenge of achieving the Zero Hunger target by 2030. Furthermore, hunger is rising in almost all sub-regions of Africa and to a lesser extent in Latin America and Western Asia (UN State of Food Security and Nutrition Report in the World, 2019). The largest percentage of undernourished people lives in Asia and the Pacific Islands, followed by Sub-Saharan Africa.

In Rwanda, statistics shows that the country experiences some challenges of food security. The Rwanda Comprehensive Food Security and Vulnerability Analysis (RCFSVA, 20015) disclosed that generally the household food security in Rwanda was good and was estimated at 80 percent of all households (1,963,975 households). Out of this number, however, 979,045 families were considered a little bit food secure, therefore that they are threatened of becoming food insecure. In total, 473,847 households were food insecure, out of which 63,696 were rigorously food insecure (RCFSVA, 2016). In addition to cyclic and chronic difficulties in accessing food, 27 percent of all households had faced one or more shocks that affected their ability to access food. At the provincial level, food insecurity is most prevalent in the Western Province and the Southern Province come next. In fact, all rounds of Food and Nutrition Security Monitoring System (FNSMS, 2015) indicated that more than 20 percent of households in both provinces had deplorable diets, with the Western Province having a higher percentage of households with improper diets.

The above raises the need to know how fishing cooperatives that are increasing in many African countries are contributing to addressing food insecurities. Using Rwanda as a case study, this research explores the contribution of fishing cooperatives on food security, focusing on Coopérative pour la Promotion de Pêche et des Activités de Vente d'Isambaza / Cooperative for the Promotion of Fishing and Commerce Activities of Isambaza (COOPPAVI) in Rubavu District.

I.3. Objectives of the study

I.3.1. General Objective

This study explores the Contribution of Fishing Cooperative (COOPPAVI) in the promotion of food security in Rubavu District.

1.3.2. Specific objectives

This study is guided by the following specific objectives:

- a. To find out the level of COOPPAVI products availability and accessibility in Rubavu District.
- b. To understand the level of COOPPAVI food utilization and stability in Rubavu District.

- c. To investigate the challenges obstructing COOPPAVI to effectively improve the food security in Rubavu District.

I.4. Research questions

The research questions formulated below will guide the researcher to address the research problem meeting the objectives mentioned above:

- a. How have COOPPAVI products available and accessible by the people in Rubavu District?
- b. What is the level of COOPPAVI food utilization and stability in Rubavu District?
- c. What are the challenges experienced by COOPPAVI in improving food security in Rubavu District?

I.5. Scope of the study

The scope of this study will be limited in space, time and within the theme of study. The study was conducted in Rubavu District, Rwanda. According to Rubavu District Development Strategy (2018-2024, p.3), this District is made up of twelve administrative sectors, eighty cells and 525 villages (*Imidugudu*). The estimated population of Rubavu district is 423,000; which represents 16% of the total population of Western Province and 4% of the total population of Rwanda. Females consist of 54% of the population of Rubavu district, which has the biggest population of all the Western Province districts (NISR, EICV3 survey, 2010–2011).

Rubavu District was preferred based on the fact that Rubavu is the second among the districts of Rwanda that experienced the shocks affecting the food security situation (47%), a high household, poorest wealth index estimated at 35%, and a moderated/ severely food income estimated at 26% (Rwanda CFSVA 2015, p.103). Furthermore, Rubavu District has 22,997 households food secured corresponding to 30%; 39,010 households marginally food secured equivalent to 44%; 19,443 households moderately food insecure equivalent to 22%; and household 3,949 severely food insecure corresponding to 4% (RCFSVA 2015, p.35).

In line with the content scope, the researcher adopted a case study of COOPPAVI, originally denoted as Coopérative pour la Promotion de Pêche et des Activités de Vente d'Isambaza, and literally translated in English as Cooperative for the Promotion of Fishing and Commerce Activities of Isambaza operating in Rubavu District. This case study helped to explore a

theoretical inquiry that would bring out COOPPAVI's contribution on food security within its real-life context particularly by satisfying different food security requirements: food availability, accessibility, utilization and food stability security situation.

This study covered the period between 2003 and 2019. This timeframe was selected based on the date of creation of COOPPAVI which is 2003.

I.6. Significance of the study

It is hoped that the study would provide additional knowledge and insights to the researcher, academicians, and the society, private and public institutions. It is further hoped that the study would contribute additional knowledge on the current and future food security debates, and improve community perceptions on the contribution of fishing cooperatives activities in improving food security particularly in Rubavu District, and countrywide at large. At this point of view, this study would provide understanding on how to increase the level of fishing cooperatives members from rhetoric to action. Academically, it is also hoped that the results of the study would add to the existing literature for academic use and for practitioners in the sector of fishing cooperatives and food security. In the same context, this study will enrich the debates on the influence of fishing cooperatives in improving food security, and it will serve as a tool of reference on the side of future academic researcher helping to improve their studies. Furthermore, the findings on this study serve as a mirror to the society, private and government institutions. In the same line, this study will help the Rwanda cooperative Agency to ascertain the effectiveness of fishing cooperatives in the development of food security vis-à-vis the pre-set objectives and expected outcomes, which will help government in the formulation of policies for a sustainable management of fishing cooperatives and progressive improvement of food security in the country.

I.7. Organization of the study

The research is divided into five chapters. Chapter one looks the general introduction and consists of background which details the subject under investigation, problem statement, general objective and specific objectives of the study, research questions, the scope, the significance and structure of the study.

Chapter two summarizes the review of academic literatures relevant to the theme under study with a look at glance on local and international perspective on the contribution of fishing cooperatives on food security in Rwanda at large.

Chapter three is about the methodology that guided the study in order to reach the pre-set objectives. It comprises the research design, the target population, sampling strategies and sample size, data collection methods and then data analysis method. The fourth chapter deals with data collection, data analysis and interpretation. Lastly, chapter five portrays the conclusion and recommendations.

CHAPTER II: LITERATURE REVIEW

This chapter underscores the definitions of key terms used in discussion throughout this study, the conceptual and theoretical framework, and literature review in the contribution of fishing Cooperatives on food security worldwide and particularly in Rwanda.

II.1. Definitions of key concepts

De Beer, (1999) suggested clarifying the definitions of study with a view to exhibiting the envisaged meaning of a concept in connection with the specific study under investigation. Similarly, operational definitions of the terms “fishing cooperatives” and “food security” were importantly discussed for easily develop the debate on the contribution of fishing cooperatives in improving food security.

II. 1.1. Fishing cooperative

The term “cooperative” has a series of definitions. This study looked into the different definitions from scholars (The international Cooperative Alliance: ICA, 1995, The International Labour Organization (ILO, 2012) and summarize them in order to obtain a operation definition succinctly clarifying the intended meaning of this study. In fact, the definitions provided by ICA, 1995 and ILO, (2020) are to some extent similar. All of these definitions converge commonly to six main key elements centered on the cooperative components. These elements include: association or group of people, willingness expressed through the commitment to come together, autonomy in management of association, shared objectives satisfying economic, social, and cultural needs, common vision, providing equitable contribution of capital, and accepting a fair share of the risks and benefits of the participation.

In context of this study, a brief definition was conceptualized based on these basic elements or characteristics of cooperative outlined above. Similarly, the term “cooperative” can be understood as a group of people autonomously and voluntarily associated with objective to satisfying their socio-cultural and economic needs and the society at large. For satisfying the different cooperative needs, COOPAVI carry out fishery activities, and therefore, COOPAVI is “fishing cooperative” or a “fishery industry”. These two terms “fishing cooperative” and “fishery industry” were interchangeably used to mean the cooperative conducting fishing activities in inland (freshwater) or water bodies such as lakes, rivers, oceans, etc.

In this regard, the word “fishery” describes the process of fish farming, fishing or catching fishes and fish processing for households food and income generation.

In context of this study, the term “fishing cooperative comprises the words: “cooperative and fishery” defined above. Therefore, a fishing cooperative in context of this study is briefly defined as “an association of people autonomously and voluntarily joined with objective to satisfy their socio- economic and cultural needs through fishery activities. In this context, the Cooperative for the Promotion of Fishing and Commerce Activities of Isambaza (COOPPAVI) falls in contention of this definition of fishing cooperatives.

II.1.2. Food security

Different scholars (Sheldon, 2012, Cohen and Burt, 2013, FAO 2012) have suggested a number of definitions to describe the term “food security and food insecurity.” The concept “food security” can be understood as an umbrella encompassing all conditions in which all people have access to adequate and permanent nutritionally food through normal channels (Sheldon, 2012, p. 7 and Linda, 2012, p. 8). The concept “food security” is used also to describe the accessibility, availability, and affordability of nutrition, culturally acceptable food to all individuals at all times (Cohen and Burt, 2013, p.i). Food security involves the individuals, households, and community ability to permanently obtain the food by using socially acceptable sources of income. Food security is defined as the situation when “all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO 2012).

In contrast, the term “food insecurity” is used to describe the inverse of the conditions described in their definitions of food security. In this regard, Cambell, and Connolly, (1989) argued that “food insecurity exists whenever the availability of quality foods (defined by their nutritional values) or the ability to acquire personally acceptable foods is limited for a person.” In this context the term “food insecurity” means the inability to acquire or consume an adequate quality or sufficient quality of food in socially acceptable ways (Radimer, and Campbell, 2012). Another term having some nuances in explaining food insecurity is the concept “hunger.” The term “Hunger” is defined as the process of being unable to obtain a nutritionally adequate diet from nonemergency food channels (Cohen and Burt, 1990, p. ii). Based on scholars’ definitions given above, the term food security in context of this study describes the

availability, accessibility of COOPPAVI fishes, utilization of fishes, and the security stability of fishes in Rubavu District.

II.2. Theoretical and conceptual framework

Theoretical and conceptual framework is part of major features for academic research. At this point of view, Colin L. and Michele K. 2013, p.20) considers this part as necessary and inalienable features for any qualified academic work. In relation to this study, this part consists of different theories and concepts that helped approach and deeply scratch the subject under investigation.

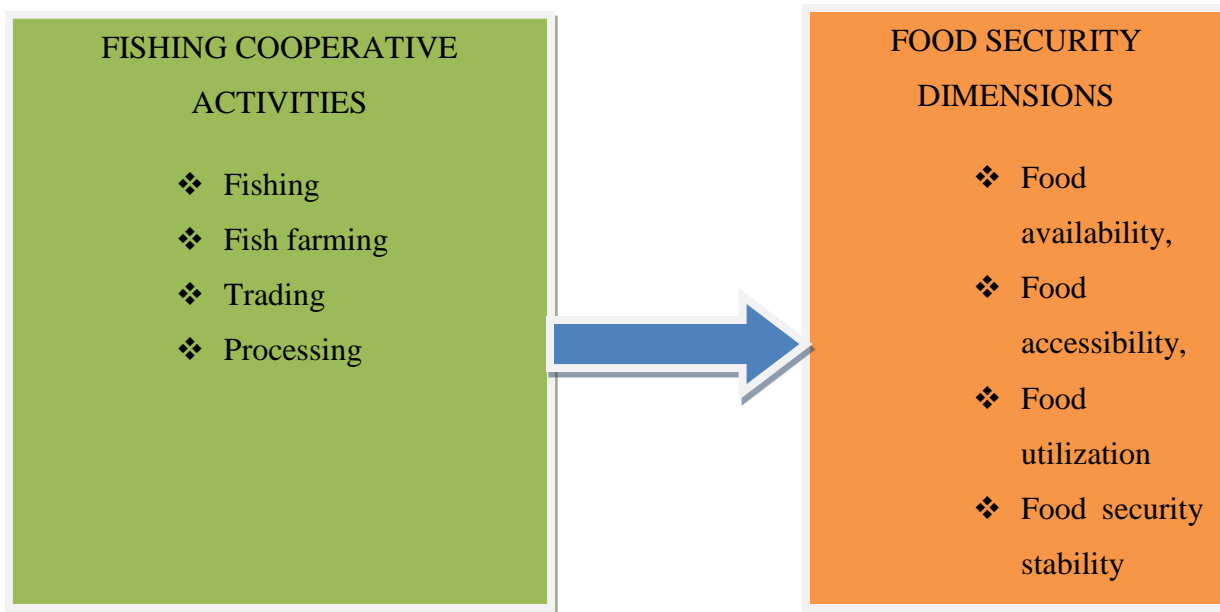
In fact, the selection of a given conceptual and theoretical approach varies from researcher to researcher and the field in which the researcher is conducting his study. Alike, Colin L and Michele, K. 2013, p.32) asserted that there is more than one kind of theoretical approach and more than one concepts framework that a researcher could use to produce a coherent research design.

From this point of view, the researcher has a steering to choose a theory and conceptual framework that he find more attractive and useful for addressing questions and problems under investigation. In the same line, the Basic Needs Theory helped the researcher to determine the contribution of fishing cooperatives in improving food security in Rubavu District. Furthermore, Colin L and Michele, K. (2013, p. 32) suggest that whatever theory and conceptual frame work developed for study, it must cohere with our problem and questions, and it must be capable of informing us how to collect appropriate data and analyze it in appropriate way. Similarly, the conceptual framework given in this study and detailed in next section focuses on fishing cooperative (COOPPAVI) activities, and food security dimensions.

II.2.1. Conceptual framework

The conceptual approach in this study attempts to define different concepts in relations to the study in order to clearly shed light to different variables of subject under investigation. Similarly, the discussion depicted in next diagram describes more the conceptual approach used throughout this study.

Figure 1: Influence of Fishing Cooperative activities and food security



Fishing cooperative activities and food security dimensions are the main concepts of concern in this study. The discussion throughout this study will be conceptualized in context of this conceptual framework presented above. In fact, the fishing cooperative activities are numerous and vary from worldwide depending on the size of fishery industry (small, medium or large scale fishery industries) and the type of business they perform and market they supply (domestic local market or international market). In regard to the present study, the fishery cooperatives industry in Rwanda, particularly COOPPAVI invest in four main activities deeply discussed in next 4 sections. These activities include fish farming, fishing, fish processing and fish trade. Briefly, fish farming focused on cultivating seed of fishes in lakes. Fishing activity focuses on catching fishes from the lakes, in other words means fish production. Fishes processing focused on processing / transforming fishes in to a series of products for conservation, storage and adding value purposes. Finally, fish trading activities involve bringing fish production (live fishes, fresh, frozen, fermented, dried, smoked, salted, etc.) to the market for business generating income or family food consumption purpose.

Fishing cooperatives come as an important mechanism helping to improve food security. In contention of this study, the fishing cooperative activities will be viewed and assessed in context

of food security effectiveness. This effectiveness will be evaluated in terms of food security components (availability, accessibility, utilization, and security stability) at household level, national level and international level. At the household and national levels, this study investigates the availability of food subsistence, household capability to access to the fishes, fish storage condition and preparation, and the household trustworthy in regard to the sustainability and security stability of fishes as a food, and product generating income improving household welfare. At international level, the discussion focuses on fishing cooperative capability to supply and satisfy the market demands outside Rwandan borders. The next section discusses in details the different cooperative fishery activities previously mentioned.

II.2.2. Fishery cooperative activities

This section gives an overview on different main fisheries - related activities. Fishery industry or cooperative activities are classified into two categories: Fish production (fish farming, fishing), and processing and trade (HLPE report, (2014, p. 27).

II.2.2.1. Fish production

Fish production is a very important sector in increasing food security. Fish production includes various activities significantly sensitive to the welfare of the society. These activities include mainly fish farming or aquaculture activity, catching fishes from inland or wild water bodies such as lakes, rivers, marine, oceans, sea, etc. (HLPE, 2014, p.23). Generally, fishes captured are used as primary food rich to protein in developing and developed countries. In fact, fishery industry contributes to food security worldwide. At this point of view, the United Nations Food Agriculture Organization (FAO, 2014a) estimated, fishes produced 17% of global population animal protein and its part accounting for 6.5 percent of all protein was consumed. In developing countries, fishes are fundamentally the potential source of income and society livelihoods. With this regard, the FAO (2014) estimates that more than 158 million people worldwide are directly sustained by different activities offered by fishery industry. These activities are generally fishing, fish farming, processing, and trading. In view of that, it obviously that fisheries and aquaculture activities contribute significantly to the food security.

Fisheries, particularly small-scale fishery cooperatives' activities and aquaculture activities are the sources of income and potential livelihoods, particularly for the vulnerable and marginalized populations in developing countries and provide essentially micronutrients to the

communities worldwide (HLPE, (2014, p.23). Globally, they generate communities' employments and shape their livelihoods worldwide. In the vein, Allison and Hellebrandt de Silva, (2013) mentioned that a significant number of people, particularly workers and their families estimated between 660 and 820 million depend totally or partly on source of income and support from fisheries, aquacultures and related industrial activities. In the same perspective, the FAO (2014a) noted that 58.3 million persons were employed in fishery industries in 2012. In developing countries, particularly in rural areas, the small scale fishery industry sector comprises about 90% of full and part-time people practicing fishery activities (FAO/World Bank/WorldFish, 2012). The small scale aquaculture fishery industry estimates 70 and 80% of the population engaged in fishery activities (Subasinghe *et al.*, 2012). Similarly, the fishing activity of COOPAVI started in 2003 as a cooperative of women living along the shore of the Lake Kivu is categorized in small-scale fishing industry.

II.2.2.2. Fishing processing and trading production

The types of market and trading production of fishery industry are determined based on “people involved, species or type of fish, area of water or seabed, method of fishing, class of boats, purpose of the activities or a combination of the foregoing features” (HLPE report, 2014, p. 24). The general picture of fishery industry as an economic activity can be assessed by looking at its operational scale varying from small scale to large scale. At this point of view, the HLPE report, (2014, p. 24) indicated that it is difficult to differentiate the small scale from the large scale fishery industry. The knot of motives unpinning this limitation relies on the reliability and validity of the measurement of production or measurement size of fishery industry termed as “scale”. In fact, the concept “scale” can be simply understood as the “size of fishing industry”, and is partly often defined contextually. In the same line, a large scale fishery industry in a given country should be a small or medium scale fishery industry in another country. To alleviate this ambiguity in classification of small scale and large -scale aquaculture and fishery industries, the HLPE report, (2014, p. 24) has identified some generic characteristics to be considered. These criteria include specifically the size of capital in terms of inputs (low or high capital input) and investment (low or high capital investment); logistics (inadequate or sufficient low or high technology of equipment); labor (low or intensive operations). In view of that, small scale fishery industries experience inadequate capabilities in context of all characteristics suggested by the HLPE report, (2014, p. 24) succinctly outlined in this paragraph. Indeed, the small-scale

aquaculture and fishery and industries are generally distinguished by large scale fisheries or aquaculture industries with its low capital input, low capital investment, and labor non- intensive operations.

Furthermore, Garcia *et al.*, (2008) underlined that the small scale fisheries usually run their fishery activities as semi-subsistence family based enterprises, and the share of fishery production is safely maintained for self-consumption. This observation was also highlighted by the High Level Panel of Experts on Food Security and Nutrition: HLPE report, (2014, p. 16). Accordingly, this report indicated that more than 120 million people worldwide survive, depending on fisheries related activities, particularly fishing, fish processing and trading. The great part of this population lives in developing countries, particularly in countries experiencing an emergent crisis of food security.

As far as the fishery production trade concerns, the literature shows that it generally depend the fisheries industries type of fisheries practices, and the small-scale fishery sector comprises 90% of fisher folk due to inappropriate fishing and fish processing practices. In fact, fishes can be distributed, transformed and/ or processed into a bulk of products. The majority of these products can be consumed as a nutritious food. At this point of view, FAO, (2012a) mentioned that fishes can be distributed or consumed in different forms: live fish , fresh, chilled, frozen, heat-treated, fermented, dried, smoked, salted, pickled, boiled, fried, freeze-dried, minced, powdered or canned, or as a combination of two or more of these forms.

Equally, the importance of small-scale fishery industry with regard to its overall quantity of production and its role in influencing to the food security is often undervalued and overlooked at international and even at national level in developing countries (HLPE report, 2014, p. 16). However, this challenge, fishes are importantly the most trade food at the international markets. The statistics of FAO, (2014a) showed that 158 million tons of fishes were globally produced in 2012, and 136 million tons of this production was used for human consumption (FAO, 2014a). In the same period, the international trade comprised 37% of the total fish production. This production earned the total export value of 129 billion USD, and this amount included 70 billion USD earned from developing countries' exports.

In addition, scholars (Heck, Béné and Reyes-Gaskin, 2012) mentioned that more than 200 million of people in Africa consume fishes on regular basis, and this figure increases progressively depending on the speed of African population of growth and urbanization expansion and development. With a view to adapt and maintaining the population growth and the current fish consumption level in Africa, the World Fish Center, (2012) predicted that in 2020 African countries will be in need of more additional fish production estimated approximately at 27 % of fishes per year (World Fish Center, 2012). In attempt to increase and adapt the African per capita fish supply to the current figure estimated at 14.2 kg per capita worldwide, an additional 10 million tons of fish would have to be supplied per year in Africa at current levels of production and export by 2020 (HLPE report, 2014, p.63). In this period, the World Bank/FAO/WorldFish, (2012) expected that fishery industry will employ more than twice as many people in fish processing and fish production trading activities. Looking at the current development of fishery industry in Rwanda, the statistics indicate that the fishery sector comprises 94 fishing cooperatives out of 8995 cooperatives operating countrywide and fishing cooperatives represent 1.0% (Rwanda Cooperative: RCA Statistical report, 2018, p.11).

II.2.2.3. Management of fishery cooperatives production income

As previously discussed, small-scale fishery cooperatives were criticized of being ineffective to maintain food security. At this point of view, scholars (Ostrom, 2013, Mills *et al.*, 2011, FAO 2012) highlighted that small – scale fishery cooperative failed to maximize sustainable community economic profits, handling fishery cooperative mismanagement, eliminate livelihoods insecurity threats and poverty, which are major problem generally threatening the majority of small scale fishery industry worldwide, particularly in developing countries.

With this regards, Ostrom, (2012) compared management of fishery industry in developed countries and developing countries. This fishery cooperative management comparison showed that developed countries have wealthy communities having a successful coordination, organization leading to effective management compared to those developing countries 'fishery industry experiencing poor management of their fishery cooperatives. In fact, developed countries have a large-scale fishery industry, while developing countries practice small-scale fishery industry. These disparities create a significant gap fisheries production, cooperatives

income management affecting food security the population livelihoods in developed countries and the food security at large.

However, this limitation, cooperatives are endowed with the potential capabilities to empower small-scale fisheries and protect them against security threats and barriers obstructing fishery industry sector development in both developed and developing countries. These barriers hindering the development of fishery industries are mainly insecurity threats such as environmental and socio-economic shocks including catch shortfalls, sickness and death in their families, natural disasters and hunger. Regardless of these difficulties faced by the small scale fishery cooperatives, the statistics from different studies have proved an importantly the significant contribution of small-scale fisheries in improving food security. Similarly, the statistics from FAO, 2012 indicated that the small-scale fisheries production increased considerably and globally comprise more than half of the marine and inland fish catches worldwide, and the great part of this fisheries production is used for human consumption. In view of that, Mills *et al.*, (2011) stated that more than 90 percent (33 million) of the world's 36 million capture fishers are employed in fisheries industries, while the remaining part of 107 million people work in fish processing, distribution and marketing.

Notwithstanding that small-scale fishery industries provide the a big number of the fish consumed in the developing countries, the majority of the small-scale fishers, lives in critical extreme food insecure condition, and they don't have the resources and opportunities uplifting them from extreme poverty. By emphasizing on critical live condition of fishers in small-scale fisheries, the FAO (20012) reports indicate that 5.8 million small-scale fishers earn less than USD 1 a day.

This challenge can create a bias towards the importance of fishery cooperatives in improving food security and the cooperative member welfare. At this point of view, the 2008 Global Conference on Small-scale Fisheries recognized that “while for historical reasons the term ‘cooperatives’ can have a negative connotation, it is generally accepted that cooperatives could improve the resilience and stability of fishing communities” (FAO, 2012). Cooperatives can: (i) increase fishers’ price-negotiating power with market intermediaries, help stabilize markets, improve post-harvest practices and facilities, provide marketing logistics and information, and facilitate investment in shared structures such as ice plants and fish processing facilities; (ii)

increase market competition by setting up auctioning systems; (iii) use their greater negotiating power to make cost-saving bulk purchases of fishing gear, engines, equipment and fuel and to advocate with government; and (iv) facilitate microcredit schemes for fishers, to reduce their dependency on intermediaries and give them greater freedom in selecting buyers. Indeed, these benefits of fishery cooperatives will undoubtedly increase the cooperative income and improve the welfare of the fishing cooperative members.

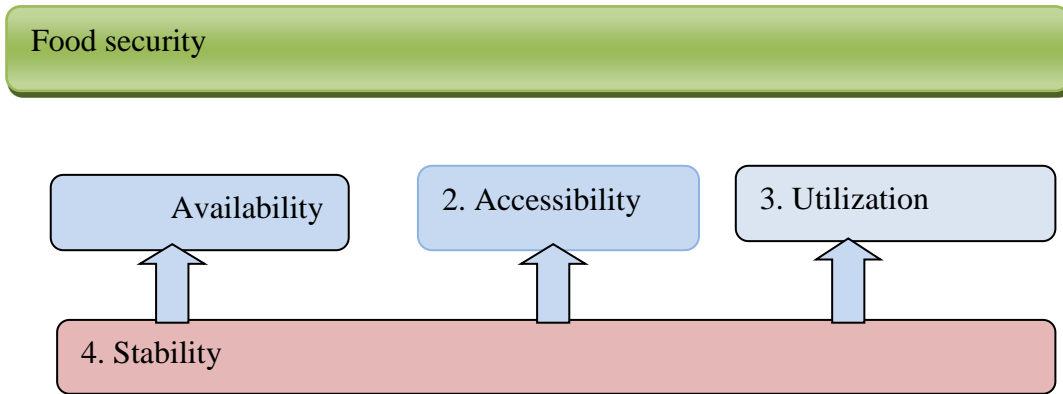
II.3. Theoretical framework

The concept cannot be understood only as a system of law like propositions as commonly perceive in simple language, but, it can be understood as any systematic set of ideas that can help make sense of a phenomenon (MCQuail, 2010, p.13). With regard to this study, food insecurity is a major concern ravaging countries including Rwanda. In other words, food security is a basic need requirement necessarily to all human being and this was expressed in resolutions of the 1996 World Food Summit. Accordingly, FAO (2012) underlined that “food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (World Food Summit, 1996, FAO 2012). To achieve to this end, different scholars identified four food security components or dimensions: food availability, food accessibility, food utilization, and Food security stability. These dimensions and the Basis Need Theory proposed by Abraham Harold Maslow in his 1943 paper "*A Theory of Human Motivation*" in *Psychological Review*" developed in USA form the corpus and the theoretical basis of this study.

II.3. Food security dimensions

As previously discussed, 1996 World Food Summit resolutions concluded that the food security a precondition for human consumption. “Food security is reassured when two conditions are fulfilled to all people at all times: (1) having the permanent physical and economic access to adequate and safe nutritious food that satisfy the population dietary needs, (2) having a privilege to food preferences improving active and healthy life”. In 1983, FO summarized the definition of food security in four main pillars briefly presented by the next chart.

Figure 2: Food security components



(World Food Summit, 1996, FAO 2015).

The physical availability of fishes, economic and physical access to fishes, fish utilization, and the security stability of these previous three dimensions overtime will be the benchmarking indicators helping to ascertain the contribution of fishing cooperatives activities in improving food security in Rubavu District. The status and extent of each food security component presented on the chart above and discussed deeply in next sections will be discussed and reported in chapter 4 presenting the research findings.

II.3.1. Food availability

Availability of sufficient food involves the overall capability of fishery industry system to fulfill food demands, and it is effectively achieved when the people are able to access to adequate food available at their disposal (Gross 2014, p.5). Generally food availability focuses on food security supply side and it depends on the food production level and stock levels and net trade.

However, Schmidhuber and Tubiello (2010) highlighted the inconsistency concerning food availability and food insecurity. At this point of view, these scholars observed that the national self-sufficiency is neither necessary nor sufficient criterion to be based on when guarantying food security at individual level. With this regard, Schmidhuber and Tubiello (2012) pointed out some typical examples of Asian countries experienced this paradox. These countries

are Hong Kong, Singapore and India. In the same context, they mentioned that the population in Hong Kong and Singapore are food secured while these two countries are not self-sufficient in agriculture sector (agriculture is nonexistent). Discrepantly, the majority of Indian population is not food secured, while the country is self – sufficient.

In fact, food availability in a country, region or local area is effective when the food is physically present for the reason that it has been grown, manufactured, imported and/or transported in these places. In this context food is available because it can be found on markets, because it is produced on local farms, land or home gardens, or because it arrives as part of food aid, etc. This is food that is visible and in the area” (International Federation of Red Cross and Red Crescent Societies, 2013).

As far as food security concerns, it is required to avail adequate nutritious food of sufficient quality and distribute it to the people in need for their consumption. In this context, food availability depends on a number of factors: food production, technology, inventory levels, local and international trade of food.

Furthermore, the Federation of Red Cross and Red Crescent Societies, (2013) outlined a series of factors that may affect food security and these include: production; distribution; and exchange. With production focus is on availability of locally produced food and its storage, while distribution relates to the transportation of the food in terms of form, to whom it is distributed and when. Exchange on the other hand relates to the quantity of food on the market that can be obtained through bartering, trading, purchasing, or loaning.

Indeed, it is obvious that food availability should be conceptualize in terms of sufficient quantity of food, and the capacity of all people to access to the food at all times for the community sustainable worthy and healthy welfare. In this context, food availability can be defined as having sufficient food available to all people at all times to sustain human life.

II.3.2. Food accessibility

As previously mentioned, there is a paradox in relation to the food availability and food security. In fact, the sufficient supply of adequate food at national and international market does not merely imply that food security at household lever is surely granted. In fact, food availability for a country as a whole or even for a world as whole does not essentially imply the food availability to all sections of population of a given community or of each individual household (Sen 2010 p.43). In fact, food access involves a command of food requested by individuals or household (Sen 1981), and it is granted when all households or individuals have sufficient resources helping

them to acquire appropriate foods through different channels (such as through production, purchase, or donation) for a nutritious diet (Gross, 2010).

Similarly, Maxwell and Smith (1992, p.11) described the concept “access to food” and linked it to the term “entitlement”. Accordingly, these scholars underlined that the “*person’s entitlement stands for alternative commodity bundles that a person can acquire through the uses of various legal channels of acquirement open to someone in his position. The entitlement relations of individuals are determined by what they own, what they produce, what they can trade, and what they inherit or are given*” (Maxwell and Smith (2010, p.11).

In this perspective,

In this perspective, food access can be understood as the way different people can obtain the available food. Normally people access food through a combination of home production, stocks, purchase, barter, gifts, borrowing or food aid. Food access is ensured when communities and households and all individuals within them have adequate resources, such as money, to obtain appropriate foods for a nutritious diet. Access depends on income available to the household, on the distribution of income within the household and on the price of food. It also depends on market, social and institutional entitlement/rights to which individuals have access. Food access can be negatively influenced by physical insecurity such as conflict, loss of coping options, such as border closure preventing seasonal job migration, or the collapse of safety net institutions that once protected people with low incomes (International Federation of Red Cross and Red Crescent Societies, 2013).

Furthermore, food accessibility can be influenced by three main factors, namely accessibility (which relates to the ability of an individual, households or communities to afford food or land for food production in relation to their income); allocation (relating to the mechanisms governing the accessibility of food by consumers); and preference (which relates to social, religious and cultural norms influencing consumer demand for food).

Indeed, food availability and food accessibility are critical ingredients to food security. Individuals and households must acquire sufficient and adequate food and have access to resources required to produce their own food (e.g. land).

II.3.3. Food utilization

Scholars (Gross 2012, Schmidhuber and Tubiello 2010) discussed the term “food utilization” based on biological perspective point of view. In fact, this concept encompasses two main components: the quality aspect, and the safety of food. These two aspects are inevitably linked to health, and sanitary condition required across the completed food chain (Gross 2013; Schmidhuber and Tubiello 2013). Undoubtedly, it would be ineffective and useless for a person to sufficiently access to adequate food, if that person is unable to utilize it. This is the center, where food security and nutrition get connected. At this point of view, FAO (2010) mentioned that the term “utilization” refers *“the proper use of food and includes the existence of appropriate food processing and storage practices, adequate knowledge and application of nutrition and childcare and adequate health and sanitation services”* (FANTA, 2011).

In this context, food utilization can be described as the way people use the food and it depends on the quality of the food, its preparation and storage method, nutritional knowledge, as well as on the health status of the individual consuming the food (International Federation of Red Cross and Red Crescent 2011). In the same context, food utilization can be influenced by the following variables: nutritional value; health status; food safety; as well as preparation and consumption.

II.3.4. Food security stability

Food stability refers to permanent sustainability of food and nutrition security and it influence the food availability, access and utilization (Gross 2012). Based on food stability, there are two distinct types of household insecurity threats: Transitory food insecurity and chronic food insecurity (CIDA 2010, 21). Chronic food insecurity occurs when households experience a constant high risk of incapability to fulfill individuals and household food needs. In contrast, transitory food insecurity happen when individuals and households food security tends to decline temporarily and this increase the high probability and risk of failing to meet households and individuals food needs in a short time (Maxwell and Smith 2010, 15). Indeed, it is crucial to note that meeting all food security dimensions all times (the food availability, accessibility and utilization and food security stability) is very important to achieve to the objective of individual and household and sustainable food security. In this regard, people, and households must live without uncertainty and ensured of their future having access to available food which should be

used in a manner that contributes to the fight against malnutrition. Indeed, food security requires that people feel secure about their future food supply, which implies the need for stability in terms of food availability, food accessibility, and utilization of food.

II.4. Basic need theory

Denis, (2010, p.13) has underlined the relevance of having a theoretical foundation guiding the research. Accordingly, this scholar argued that a theory must guide action or predict a consequence (believes). Similarly, the Basic Need Theory will help to identify the different activities conducted by fishing cooperatives, and its effectiveness in improving food security. In fact, the Basic Need theory was initiated by Abraham Harold Maslow in 1943 and continuously developed in different social science studies. In his work entitled “*A Theory of Human Motivation*” in *Psychological Review*” published in 1943 in United States of America, Maslow organized a hierarchy of human being needs. According to McLeod, (2018), these needs were grouped into three categories: (1) Basic needs including physiological needs (water, food, warmth, rest) and safety needs (security, safety); (2) Psychological needs including belongingness and love needs (intimate relationships, friends) and Esteem needs (prestige and feeling of accomplishment); and (3) self-fulfillment needs including self-actualization (achieving one's full potential, including creative activities). In contention of this study, the basic need theory covers the scope of the first category of human basic needs including physiological and safety needs. The Basic Needs Theory contends that all the people must satisfy their basic needs. The fulfillment of basic needs is a precondition for a “full-life”, composed of material and non-material elements (Stewart 2010). In the same context, food security is inevitably a human basic need which in context of this study should be ensured by fishing cooperatives, particularly COOPPAVI in Rubavu District.

II.5. State of food security in Rwanda

The different government sources in Rwanda indicate that the food security in Rwanda had a progressive development over time; however, some cases of food insecurity were recorded. In 2006, the statistics show that the majority of households in Rwanda (52%) are in critical food insecurity conditions. This figure comprises 43% of vulnerable households living in rural areas (RCFSVANS, 2012). Similarly, the statistics from a survey conducted in 2009 revealed the 17.3

% of households had a borderline poor of food consumption, while 78.5 % of households had satisfactory food consumption (NISR and World Food Programme, 2013, p.13).

In 2012 a national survey conducted in April-May 2015 disclosed that in the 12 months before the survey, 51 % of households experienced difficulty in accessing to sufficient food (MINAGRI NISR and WFP, 2012, p. 15). This figure included people who had experienced either: re-occurring seasonal problems accessing enough food; unusual acute problems accessing enough food; or chronic problems accessing enough food for most of the year. According to RCFSVA (2015) about 80 percent of households in Rwanda were food secure whereas 20 percent were food insecure in 2015 and of the 20 percent of households considered food insecure, 17 percent were moderately food insecure and three percent are severely food insecure as observed by MINAGRI NISR and WFP (2012, p. 15).

MINAGRI further observes that the lower rate of food secure households at provincial level were in Western Province, with more than a third of food insecure households, while the highest rates were found in Kigali City. This pattern confirmed similar findings by the 2012 RCFSVA, which had also identified the Western Province as the most food insecure area followed by the Southern Province (RCFSVA 2015 p.34).

II.6. Global and regional fishing production

Fisheries and aquaculture sectors are socially and economically growing rapidly and they employ 260 million people. These sectors contribute a global mean of 17 kg per person per year of micronutrient rich animal food and contribute US\$ 100 billion annually to global trade. Fish is among the most traded of food commodities with 38% of all recorded fishery production traded across national borders in 2010 (McClanahan, et al., 2013, p.1). Developing countries supplied just over 50% of global fishery exports (fisheries and aquaculture combined) by value and 60% by weight – 67% to developed countries (FAO 2011). The majority of African countries have considerably increase aquaculture production.

FAO further observed that Uganda's aquaculture production was highly increased from 5,539 mt to 32,392 mt in period of two years (2004 and 2006) whereas in the same period, Nigeria ameliorated its aquaculture production from 43, 950 mt to 84,578 mt, while Kenya in 2009/2010 Financial Year invested US\$ 14 million in fish farming projects aimed at stimulating aquaculture

production and support the fishing industry. In East African Community (EAC), the literature shows that fishing production increase progressively over times. In 1990s, the fishery production started to decline considerably as a result of fishery production enterprise challenges. However, countries are supporting fishery industries for improvement, though aquaculture production level is still insignificant.

In Rwanda, the background of fishery industry shows that practiced fishery is artisanal fishing for a long time. From the colonialism period, fishery production sector has never been the main economic activity due to the lack and/or poor applied fishery tradition practices. In the period of 1985 to 1987 different projects (BCEOM and PAIGELAC projects) were initiated the Government of Rwanda and donor with a view to improve and increase fisheries production.

Generally, fish farming started at the end of the 1940s through the practice of subsistence aquaculture which required minimal investment with low production. This ineffectiveness in fishery industry development was due to several upheavals and conflicts characterized Rwanda from 1960 up to 1994 Genocide perpetrated against Tutsi.

After 1994 Genocide against Tutsi, the fishing industry started to gain momentum and it was considerably developed and supported by the government as an economic activity. According to Mwanja (2011), in 2009 the fishing industry produced an estimated 9,050 mt per year and the current trends of fishing in Rwanda estimate the national fish production at 13,000 tons. Mwanja further observes that this figure includes capture fisheries production of 9,000 tons and aquaculture production of 4,000 tons. MINAGRI, (2018, pp.3-6) underlined that there is a need to learn from the past experience and set a new productive fishery industry re-development scheme that will increasing tremendously fisheries production in Rwanda.

II.8. Influence of fishery cooperatives on food security

Different studies (Béné *et al.*,2011, HLP E Report, 2014, p.34) underscored the relevance of fishery cooperatives in providing food security and improving community safe and healthy welfare. In fact, cooperatives fishery industry activities (fish farming, fish processing, and fish trading) generate the households' resources of income, and they provide the food commodities to individuals and households. This section discusses deeply the influence of fishery cooperatives on food security at the national and household level.

II.8.1. Employment and fish-dependent livelihoods

As previously discussed, FAO (2012a) indicates that as a food, fish can be processed into a wide array of products. It is distributed as live, fresh, chilled, frozen, heat-treated, fermented, dried, smoked, salted, pickled, boiled, fried, freeze-dried, minced, powdered or canned, or as a combination of two or more of these forms. Fish production, processing and trading activities generates income to fishery cooperative members. At this point of view, the FAO statistics revealed that in 2012, fishery industries produced 158 million tons of fish worldwide and 136 million tons of this fisheries production used as human consumption (FAO, 2014a). In fact, the fishery cooperatives plays a great role in making food directly available to those in need and create job opportunities generating resources of income to households and individuals that can be used to improve their health living styles (John, 2013).

In this context, the literature shows that about 660 and 820 million people worldwide depend entirely or partly their food security and economic support on fishery industry.(Allison, and Hellebrandt de Silva, 2013). Accordingly, the FAO (2014a) indicates that 58.3 million people worldwide were employed in primary capture fisheries and aquaculture sectors in 2012. In this period, the fishery adding value activities (fish processing and trading) created employment opportunities to more than twice of the people involved in each stage of fishery production adding value chain (World Bank/FAO/World Fish, 2012).

II.8.2. Household level

Fishery cooperatives are important source of food security in both developed and developing countries. Small scale fishery industry activities (fish farming, fishing, fish processing and fish trading) sustain a significant number of households in developing countries. Subsistence fisheries offer to the majority of food insecurity vulnerable individuals and households an adequate nutrition and sources of income and livelihood through employments and trading of fish product commodities 'chain (fish distribution, fish processing, fish exporting and vending (Kawarazuka and Béné, 2010). A compilation of ten case studies equivalent to 20% of aquaculture fishery industry production conducted worldwide came to conclusion that about 38 million full-time employees served in sector of aquaculture value chain activities (Phillips and Subasinghe, 2014; HLPE 2012a, HLPE 2013b).

In the same context, these studies pointed found that small- scale fisheries employ 34 million of full-time and part-time fishers and approximately about 90 percent of these employees depend their livelihood on small-scale fishery activities (Mills *et al.*, 2011). Indeed, the literature on fishery industry underlined that an important bulk of small -scale production (70 and 80 percent of aquaculture ventures), particularly subsistence fisheries in rural areas use a significant part of fisheries production for human consumption (Subasinghe *et al.*, 2012). Therefore, the contribution of fishery cooperatives on food security worldwide, particularly at households, individuals' level cannot undoubtedly be contested.

II.9. Challenges facing fishing cooperatives

Fishery or aquaculture development has a range of challenges and externality country which can differ from one country to another. According to the different literatures (Belton *et al.*, 2011a), these challenges include the difficult experiencing small-scale fishery industries in relation to the low capital for investment in fishery industry and compulsory technical conditions necessary for engaging in competitiveness at national and international markets, (Belton *et al.*, 2011a).

In addition, scholars (Umesh *et al.*, 2009, HLPE, 2013b) underlined the challenges associated with the lack of fairness in implementation of international policies and interventions to support fishery industry at regional and national levels, informal fishery employments, and the fishers' inaccessibility to social protection schemes such as pension schemes and health insurance.

According to MINAGRI (2019) the fishing industry in Rwanda faces different constraints including declining fish stocks, increasing fishing malpractices, and increasingly costly fisheries management demands, the lack of data base regularly monitoring the fisheries resource base and stocks with a view to update the decision-making process on the updated status of technical data of fisheries stocks in body water of Rwanda, low capital investment, lack of technology, fish seed, poor fish processing, and the lack of market for the fish.

CHAPTER THREE: RESEARCH METHODOLOGY

III.1. Introduction

The objective of the study was to explore the Contribution of Fishing Cooperative (COOPPAVI) in the promotion of food security in Rubavu District. This chapter presents the methodology applied in the study. It covers research design, study population, sampling techniques and procedures, data collection methods and procedure as well as data analysis plan used in the study.

III.2. Research design and approach

According to Welman and Kruger, 2011 p.15, research design is a plan followed by a researcher to collect data from respondents during the investigation of a research problem. The researcher used qualitative research design in conducting the study. The qualitative research method encompasses the investigative approaches that generate narratives from respondents which provides answers to the problem under study, (McMillan and Weyers 2011, p.123). This design enabled the researcher to explore deeply the contribution of fishing cooperative on food security. The case of COOPPAVI in Rubavu District. Indeed, this research design helped to collect information by using interview (Kombo and Tromp, 2010, p.19). Thus, food insecurity is a phenomenon that requires studying deeply the different threats to food security and parties involved in protection of the community against food insecurities which in context of this study includes the COOPPAVI.

The researcher considered the qualitative design as it helped in collecting data related to feelings, thoughts, processes, and emotions towards the problem that is difficult to extract and obtain through quantitative methods and it gives more information on the problem at hand. (Strauss and Corbin 2010, p. 11). The method was compatible with the characteristics of the population targeted by the study who are more experienced in dialogue as easy way of communication. The nature of the problem under study justified the choice of qualitative method for it to be addressed because it needs feelings, opinions, perceptions and emotions of people. Lincoln and Guba, (1985, p.120) proposed that for better understanding of a problem, the targeted people must be exposed to information in the form which they are used to and in-line with their previous. Thus, people are frequently familiar with direct interactive communication such as interviews which are normally used in qualitative research approach. Likewise, Stern, (1980, p.45) suggested that

qualitative method can be used to explore substantive areas about which little is known or about which much is known to gain novel understandings. As well, qualitative research can be used to explore new things or areas which are already known to gain in-depth information and understating which is not the case with quantitative. Alike, this study is classified among security studies, a field which is ostensibly in its recent development. The research problem of this study, clearly supports the discovery of new information that necessities the implementation of the qualitative approach to research. Similarly, qualitative design was selected on grounds that it is flexible and accepts the complex and dynamic quality of the social world. It is also important to consider that the general objective of this research is to develop at least a theoretical framework helping to determine the contribution of cooperatives on food security. The qualitative method used made it easy for the researcher to understand various views from fishing cooperative members, customers and local authorities on the describing the general picture of food security in Rubavu District and the effect of fishing cooperatives activities to satisfy the food security needs.

III.3. Selection of participants

To select participants for this research, I used the purposive sampling technique. This approach allows the researcher to use his own discretion to select units from the population who are knowledgeable and experienced in the area of study. (Amin, 2012, p.243, Jothikumar, 2011, p.21). Only those people who had relevant information pertaining to the study were selected. Scholars mentioned that it is difficult to select the sample size for a qualitative research as there are no strict rules and procedures to follow. (Patton cited in Hoepfl, 2011, p.50). According to Eisner (2011, p.18), qualitative studies uses different forms of evidence which do not have any statistical test significance to determine if results. Hoepfl further observed that the decision on the usefulness and credibility of results are left at the discretion of the researcher. In the same context, this study involved 93 participants purposively selected, and limited to that number following the principle of saturation. The selected participants include 40 cooperative members, and 50 respondents selected among the community consuming the products of COOPAVI, and 3 local authorities in Rubavu District. They all experience and have knowledge about cooperatives' activities and the food security.

III.5. Data Collection Methods

The researcher used various methods to collect primary and secondary data. These include interviews, observing behaviors of participants, official reports and media articles. There are many data collection methods that were used in research and the appropriate ones are those assist the researcher to address the purposes of study. Welman and Kruger (2010, p.127) assert that the population under study also helps in determining the type of data collection methods. The researcher considered the type of data to be collected either in the form of primary or secondary data in choosing the best data collection methods.

Primary data collection

According to Blaikie (2010, p.23), primary data is data collected directly from the respondent through the use of questionnaire, interviews or observations to generate answers to a research problem. Welman & Kruger (2010, p.9), define an interview as a purposeful conversation between two or more people aimed at facilitating exchange of ideas. In fact, an interview is suggested by different scholars in method for qualitative study such as this one establishing the contribution of cooperatives on food security. A qualitative research has “an interpretative character, aimed at discovering the meaning events have for the individuals who experience them and interpretations of those meanings by the researcher. Eisner (2010) describes qualitative research reports as descriptive, incorporating expressive language and the presence of voice in the text. The purpose of interview is to find out what is in and on someone else’s mind. We interview people to find out from them those things we cannot directly observe (Patton 1990 cited by Ghee and Barr 2003, section 3, para.6). Qualitative research interviews are defined as “attempts to understand the world from the subjects” point of view, to unfold the meaning of peoples’ experiences, to uncover their lived world prior to scientific explanations” (Hopfl, 2012, p.49, Kvale, 2011, p.29).

For the purpose of this study, unstructured interview or open-ended interview was used to elicit an authentic account of the interviewee experience on the contribution of fishing cooperatives in improving food security in Rubavu District. This unstructured interview was administered to set 13 interviewees (the 5 staff from COOPAVI, 5 customers of COOPPAVI, 3 local authorities) who were considered to be knowledgeable and experienced in the field of study.

This interview technique was selected based on its advantage: flexibility in data collection, facilitating more relaxed research atmosphere or relaxed social interactions between the researcher and respondents helping to elicit an in depth research information (Karin, 2008, p. 126). All respondents freely discussed different questions asked and the researcher asked clarification where necessary (Welman and Krung, 2010, p.160). The discussion was done with reference to reviewed literature, subject under investigation, which is the contribution of cooperatives on food security: the case study of COOPPAVI, in Rubavu District and the study pre-established questions (finding out the level of food accessibility, availability, food utilization, food security stability in Rubavu District, and identification of challenges). With a view to keep a record of the interview discussions for future reference, a tape recorder was used, with permission from the participants. The researcher had the opportunity to sit with the interviewees and ask all questions helping him to get relevant information to the subject under investigation.

❖ **Secondary data collection**

Bluman (2012, p.111) defines secondary data as, “data which have already been collected and analysed by someone else.” The researcher reviewed secondary data such as government census and other official records for general information purposes related to the research problem. Accordingly, an in-depth research must be carried out to have an understanding of all issues surrounding the subject (Clarke, 2010, p.67). As far as this study is concerned, a number of related local and international sources were consulted in order to get a clear understanding of the subject under study. Additionally, electronic sources, books, and, publications from different scholars were also reviewed.

Having consulted all the secondary data at researcher’s disposal, the researcher gained expanded knowledge and a widened horizon on the magnitude and the contribution of cooperatives on food studies and opinions. Likewise, different audio scripts and television movies illustrating the reality on cooperatives and food security were collected to enrich the library based research.

III.5.2. Interview

The researcher used unstructured interview to collect primary data from the field. Unstructured interview was very important to the research as they give flexibility to the respondents to express their views without being influenced (Kvale, 2010).

The interview consisted of 13 respondents, comprised of 5 staff from COOPAVI, 5 customers of COOPPAVI, 3 local authorities. The interview was recorded by taking hand written notes, as respondents preferred not to be audio recorded for the purpose of sustaining the anonymity.

III.6. Focus Group Discussion

According to Kitzinger (2013), focus group discussions are done collectively in a group aimed at examining a specific set of issues. This method was helpful for it managed to collect the perceptions of fishing cooperative members and customers on the contribution of fishing cooperatives on food security. Focus group normally consist 6 to 8 people with comparable social and cultural backgrounds, experiences, and or concerns, (Ritchie et al. 2010). Basing on this assertion, it implies that the size of groups in collective conversations must be small for easy management. The researcher interviewed 9 groups of 8 participants through the use of focused group discussions, giving a total of 75 respondents.

III.7. Data analysis methods

Levine (2011, p.1) defined data analysis as, “a body of methods that help to describe facts, detect patterns, develop explanations, and test hypotheses”. The researcher used historical, comparative data and library-based research analysis methods which are aligned to qualitative design. The collected data was grouped in different themes and codes.

III.9. Ethical considerations

Conducting research is guided by research ethics which needs to be followed for credible results. Thus, the researcher considered all ethical implications as proposed by Leedy and Ormrod (2011, p.67) which include respondents’ protection from harm, informed consent, right to privacy, and honest with professional colleagues. Prior to conducting data collection, the researcher sought authority from the University and this authorization was presented to the respondents and the researcher explained the purpose of the study. Participants gave their consent and willingly participated in the study without expecting any reward. A conducive and private environment was used to conduct the interviews which gave the participants guarantee to anonymity and confidentiality. Consent on publishing of results was sought on conditions that the identity of respondents will not be made public.

CHAPTER FOUR PRESENTATION AND INTERPRETATION OF FINDINGS

IV.1. Introduction

The objective of this study was to investigate the contribution of fishing cooperatives on food security in Rwanda: The case of COOPPAVI. In this part, the researcher analysed and discussed the findings of the study emanated from the data collected from the field and other sources. To achieve to this end, the respondents reports and complementary discussion from the researcher respondents to three main objectives: Find out the level of availability and accessibility of COOPPAVI fishes, fish's utilization and stability in Rubavu District, and identification of the challenges preventing COOPPAVI to effectively improve the food security in Rubavu District. Generally, the discussion and analysis of the respondents' views on objectives above was organised in four sections. The first section deals with the chapter introductory part, the second tackles the respondents' social and demographic characteristics, the third section discusses the availability and accessibility of COOPPAVI fishes, the fourth section deals with the fishes utilization and stability, fifth section presents the different challenges obstructing COOPPAVI to effectively improve food security in Rubavu District.

IV.2. Social and demographic characteristics

The respondents' background information and characteristics were assessed based on their gender, age, education level and working experience. This information appears in tables 4.1 to table 4. 4.

Table 4.1: Gender of respondents

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Females	85	91.4	91.4	91.4
Valid Males	8	8.6	8.6	100.0
Total	93	100.0	100.0	

Source: primary data from COOPPAVI

Table 4.1 herein reflects that most of the respondents were females (91.4%) compared to the male respondents who took 8.6% of the total respondents. Generally, fishing cooperatives on the shore of Lake Kivu are a male dominated industry. COOPPAVI is the only fishing cooperative having a big number of female members and few males who joined the cooperative. This is because COOPPAVI was formed with objective to uplift welfare of females. This high rate of females (91.4%) in business improving food security is an advantage to break down gender stereotypes which in context of this study are the major barriers to food security.

In fact, women are the major group experiencing the effects of food insecurity, while playing an important role in sustaining their homes. Hence, they make drastic contribution to the accessibility of sufficient, safe and nutritious food for the majority of the people. Additionally, the empowerment of women reduces the effects of food insecurity by making it possible for them to access, avail and properly utilize the food. The food utilization means having the knowledge of basic nutrition and care. In the same perspective, COOPPAVI teaches its members about cooking fishes and their nutritional value.

Table 4.2: Respondents' Age Group

Age group	Frequency	Percent	Valid Percent	Cumulative Percent
20-30	24	25.80	25.80	25.80
31-40	39	41.94	41.94	67.74
Valid 41-50	28	30.11	30.11	97.85
51-60	2	2.15	2.15	100.0
Total	93	100.0	100.0	

Source: Primary data from COOPPAVI

Based on the information in table 4.2 herein, 97.85% falls in 20 and 50 age groups. The age group is important in describing the capacity of the cooperative in running business. In fact the majority of old people are economically dependent to their families, because it is difficult to them to effectively perform their duties.

Indeed, a fishing cooperative (like COOPPAVI) having the majority of members who are still young, has also a high and easy probability to perform its activities. In the context of this study, the majority COOPPAVI members are young and thus, it has an energetic workforce to perform fishing activities and increase the fishing production. Therefore, this active workforce has a significant effect on food security.

Table 4.3: Education levels of respondents

Level of Education	Frequency	Percent	Valid Percent	Cumulative Percent
Diploma Level	2	2.15	2.15	2.15
Secondary Level	12	12.90	12.90	15.05
Primary Level	79	84.95	84.95	100.0
Total	93	100.0	100.0	

Source: Primary data from COOPPAVI

The information presented in table 4.3 reveals that 84.95% of respondents underwent primary school education, followed by 12.90% who have S6, while 2.15% are A2 diploma holders. Education empowers people with knowledge in different sectors. It shapes a sense of people innovation and creativity likely to increase the probability to job creation. Similarly, fishing cooperative members with literacy are likely to effectively compete and perform fishing activities compared to cooperative having a big number of illiterate members. In this regard, the majority of COOPPAVI members are literate and thus, this increase the cooperative development and member household food security development.

Table 4.4: Membership to COOPPAVI

Membership to COOPPAVI	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	65	69.89	69.89	69.89
No	28	30.11	30.11	100.0
Total	93	100.0	100.0	

Source: primary data

According to the Table 4.4, there is reflection that 69.89% of respondents were members of COOPPAVI, while the rest of respondents (30.11%) were customers of COOPPAVI. In fact, the statistics above increase the trustworthiness of the study findings as discussions in this study came from the reliable fieldwork sources. Indeed, the biased information was avoided by interviewing relevant respondents from COOPPAVI members, and Customers.

IV.3. Contribution of COOPPAVI on food security

The finding was managed through organizing different themes in simple language in order to facilitate the respondents' understanding of the subject under investigation. With this regard, De Vos et al., (2011, p.408) suggests that in qualitative research, the researchers should convert into appropriate text units like words, sentences and an entire story for analysis, either manually or by computer. Thematic data analysis was important in data collected analysis of the respondents' answers. At this point of view, Ryan and Bernard (2011, p.59) states that without thematic categories, the researcher has nothing to describe, compare and explain. This study describes and explains the phenomenon in question, thus the themes were organized mainly according to the interview guide and the participants' answers recorded on researcher transcripts.

Generally, these interview reports are the output of narrated stories presented in the next four main themes:

- COOPPAVI activities,
- availability and accessibility of fishes,
- utilization and food security stability,

- challenges and suggestions.

Indeed, the thematic foci, above, each one was discussed by different focus group discussions and interview, and an effective comparison of the respondents' perceptions or views and control of biased information were managed

IV.3.1. COOPPAVI activities and cooperative member welfare

The fishery industry activities are generally classified in two categories worldwide. The first category focuses on fish production that includes fish farming and fishing (catching up fishes). The second category of fishery cooperatives activities is fish processing and trade. In this context, this study attempted to ascertain if COOPPAVI carries out these above listed activities. Similarly, the interview and FGD 1-7 reports unveiled that: *“the activities conducted by COOPPAVI are fishing or catching the fishes, processing the fish and selling the fish production. The harvest we produce vary depending on the season and it is estimated between 500ks and 1 ton per month.”*

The COOPPAVI's fishery activities create different opportunities improving food security and the welfare population, particularly COOPPAVI members. At this point of view, the FGD 6-9 disclosed: *“The members of the cooperative have got different opportunities. For example, it is easy for us to buy fishes at the lower prices and feed our families. COOPPAVI reduces the prices of fishes to the cooperative members. COOPPAVI Members get also share the income earned two times per year. This money earned helps us to handle different socio-economic challenges in our families such as building shelter, feeding the families, paying school fees for our children, paying healthcare insurance (Mutuelle de Santé), buying plots, cattle and land, finding start-up capital to run a business etc.”*

This information was also similar to different interviews and FGD reports from the cooperative leadership and cooperative members. Based on these different respondents' opinions, it is evident that COOPPAVI contributes to the improvement of cooperative members' welfare and the population in Rubavu District at large.

IV. 3.2. Availability of fishes

The fish availability involves the ability of the fishery cooperatives system to supply fishes at the market and meet the people's food demand (Schmidhuber and Tubiello, 2012, p.18). The quantity of fishes must be sufficient and ready at the disposal of the fishing cooperative members and customers (Gross 2012 p.5). Four indicators/factors helped to determine the level of fish availability, in Rubavu District: fish production (quantity of produced and processed fishes) fish delivered at the market, fish distribution mechanism (status of fishes: processed, time to deliver the fishes, market distance, and customers), and fish exchange modalities (price: loan/cash). The respondents' answers, on availability of fishes in Rubavu District, differ.

Accordingly, Interviewee 1 disclosed: *"The primary food in different families include fishes. In my family, we eat 3kg of fishes at least in a week. Fishes are abundant at the market and the price of fishes is approximately estimated between 2500 Frw for fresh fishes and 5000 Frw for dried fishes."*

Furthermore, the interviewees were also asked if they are satisfied with the price of the fish. In this context, the FGD 1&5 replied that: *"Fishes are expensive, not every citizen can afford to buy fishes!"* They added: *"The price of fishes varies depending on the types of fishes (fresh fishes, wrapped dry fishes) and fishes are paid in cash. COOPPAVI cannot retail the fishes through loans."*

This information was also reiterated by interview report collected from the customers. Equally, the FGD 1-7 disclosed: *"the size of the market is large. The bulk of slots of fishes are exported in DRC where they sell fishes at the good price. The remaining part of fishes is dispatched in Rwanda and sold at an expensive price. However, insufficient the quantity of fish produced, the quality is good and delicious. This attracts a taste of many customers."*

Interviewee 5 confirmed also this information. He stated: *"We receive some customers' complaints contesting the price of fishes. Generally, the price of fishes is not expensive compared to funds invested in maintenance of fishing equipment, the cost of labor, the money spent on processing, storing and transport of fishes at the market, etc."*

Furthermore, the interview held with the COOPPAVI President indicated that the size of the market is large and the COOPPAVI cannot sufficiently afford to cover all customers' demands in Rwanda and in neighboring countries such as the (DRC. The customers demand is high at the market and this affect the price at the market. He mentioned also that the price of 1kg of fishes exported in neighboring countries is approximately between 5000Frw and 7000 Frw, while in Rwanda 1kg of fishes is bought 2500Frw and 5000Frw. It is not easy to estimate the size of the market and the weight of production per year. Generally, COOPPAVI produces around 12 tons of fishes per years sold to 8000 customers. Particularly in Rubavu District, COOPPAVI products are sold to 750 customers.

Indeed, the different interviewees' counts reported above show that the food availability in Rubavu District is moderately not satisfied. The quantity fishes at the market are inadequate and the price of fish at the market is expensive. This is due to traditional fishing approach used, people who deteriorate fishes by using inappropriate tools of fishing, and the small harvest of fishes.

IV.3.3. Accessibility of fish

A clear distinction between the food availability and food accessibility can be identified. The availability implies the supply of sufficient quantity of commodities to the market. This does not guarantee the food security (Sen 2012, p. 43). In contrast, the food accessibility embraces the capacity to satisfy the households or individuals' food command (available money or income to buy fishes) and the fish distribution process. The discussion on food accessibility in Rubavu District emphasized on different on four main criteria: affordability (capacity to buy fishes), allocation (policies / strategies to dispatch fishes), and customers preferences to buy and eat fishes.

With this regard, the interview reports from FGD 1-9 stated that: "However the money and bonus earned by the COOPPAVI members and the reduction of price of fishes, they are not able to eat fishes every day."

Similarly, the customers of COOPPAVI in Rubavu District reported the same information. The FGD 1-6 expressed that: *“There is a significant number of the populations who are not able to buy fishes due to the poverty.”*

Equally, the leadership of COOPPAVI established the same reality. In the same context, the interview 3 stated that: *“Our cooperative supplies fishes at the market. In previous discussion on fish availability, I mentioned an issue in connection with customers’ complaints highlighting that the price of fishes is expensive. This customer perception should be linked to the customers’ poverty. May be there is a significant number of people who remain in their neighborhoods without buying fishes.”*

In line with the distance between the market of fishes and the households, the respondents informed that this distance vary from one place to another. The customers FGD 7 and 8 stated: *“The main market of fish in Rubavu District is located in Rubavu town. Generally, customers travel approximately 3km to 5km to reach the market. The markets for fish are few and they are not located everywhere in Rubavu District. This distance is long. As a solution, in most of the case, we buy fishes with the local people who dispatched the fishes in neighborhoods.”*

In addition, the interview held with the COOPPAVI Leadership and the COOPPAVI members FGD 4 and 6 confirmed this information. The interviewee 2 reports mentioned that: *“the vehicles equipped with appropriate fridges supply fishes countrywide and in neighboring countries. These vehicles are few to the extent that they can dispatch fishes in Rubavu District.”*

Indeed, the interview reports above indicate that however the step forwarded by COOPPAVI in running a business of fish, the level of fish accessibility is still low. The affordability to buy fishes is hampered by the poverty experienced by different households, the policies and mechanisms regulating the transport of fishes to the markets countrywide and abroad are not equally enforced in rural and urban areas. The preferences to eat fishes were reportedly high and therefore increased the customer supply demands. This point of view reflects also the experiences and reports of the government on the fish availability and accessibility in Rwanda.

IV.3.4. Food utilization

Food utilization covers broadly a range of criteria: appropriate food processing, proper storage practices, quality of food, people's knowledge on nutrition, people healthcare and sanitation (FAO 2012, FANTA, 2010). Similarly, the interview held with the respondents food utilization focused on nutritional value provided by the fishes, health status after consuming fishes, food safety, and preparation and consumption of fishes in their respective neighborhoods.

At this point of view, the interviewees 1,4 and FGD 2, 3, 4 stated that: "the COOPPAVI sells the fishes processed in two ways: selling fresh fishes (fishes caught immediately and not transformed), and dry fishes (hit fishes and fishes flied fishes)."

Furthermore, one of the customers from the FGD 7 stated: "*we are satisfied with the quality of COOPPAVI fishes. They are delicious and rich to nutrients. Generally, COOPPAVI fishes are safe and well packaged (not spoilage and not toxically contaminated).*"

In addition, the respondents' interview showed that all respondents know the importance of eating fishes in their family. A respondent from the FGD 3 stated: "*Fishes are very important food. They help our body to grow well and strength our body defense mechanism against sickness. However, they are not consumed every day due to poverty. Briefly, the majorities of us prepares and consume fishes in healthy and hygienic way to avoid diseases.*"

Furthermore, the customers from the FDG 5 and COOPPAVI members FGD 4 criticized the storage condition and preparation of fishes at home. They stated: "*The way some of us store and cook the fish is poor. This results from the nature of ignorance and resisting to hygienic regulations, characterizing some customers. Fortunately, we don't record the cases of sickness linked to the poor storage and preparation of fishes.*"

However the criticisms above focused on the customers only, the government of Rwanda stressed that this problem targets the entire fishery sector. In the same context, the MINAGRI, (2019, P. 29) pointed out that "modern and appropriate fish processing and product development is not yet visible in Rwanda. The only fish processing methods in use are traditional smoking and sun drying on lake beaches. The low level of fish processing and products development could be attributed to the artisanal nature of the fisheries and lack of fish to process". Indeed, the interview and the FGD reports above indicate that food (fishes) utilization in Rubavu District is

effective, however some challenges related to food safety (hygiene and sanitation in fish preparation, storage and consumption). This need awareness and sensitization campaign on hygiene and sanitation in order to improve food security.

IV.3.5. Food security and stability

The food security and stability were discussed in this subsection based on different scholars' arguments on food insecurity threats. Experts (Maxwell and Smith 2010, p.15, CIDA 2010, p. 21) underlined that the food insecurity threats are assessed based on temporal determinants. Accordingly, there is a chronic or cyclical/ seasonal food insecurity (state of being in a continuous high risk of inability to meet the food needs of household members) and transitory or temporary food insecurity (temporary decline in the security of household and the risk of failure to meet food needs in short duration). A report from CIDA (2010, p.21) stated: "Chronic food insecurity means that a household runs a continually high risk of inability to meet the food needs of household members). Generally, temporary food insecurity occurs for a limited time because of unforeseen and unpredictable circumstances while cyclical or seasonal food insecurity occurs when there is a regular pattern in the periodicity of inadequate access to food".

At this point of view, respondents were asked to demonstrate if they face the temporary and seasonal food insecurity threats preventing them to have access to the fishes and the duration of the food insecurity. Similarly, FGD 2 and 4 selected from COOPPAVI members stated that: *"they have experiences temporary and seasonal food insecurity threats."* The FGD 1 explained that: *"Sometimes, we face unfavorable weather conditions that reduce the fishing production and/or affecting our sources of income and the income of our cooperative. In this case, we are unable to buy fishes and sustain our families." Chronic food insecurity threats are faced by the majority of people who do not have the sustainable source of income. These people are our neighbors who live in critical conditions due to poverty. They are not able even to buy fishes."*

This interview report observation was also shared by the customers and the COOPPAVI Leadership. Equally, the interviewee 2 stated that: *"sometimes our harvest of fishes and the business are declined due to climate change and failure of some poorest people to buy fishes."* He added further that: *"they try to support the cooperative members, advocate for poor people support and request different actors to facilitate COOPPAVI to overcome this problem."*

This point of view is also similar to the government observations on constraints affecting food security and stability. Equally, these limitations as observed by MINAGRI (2019) include “fishing malpractices such as use of under size mesh nets, striking of water surface (typhooning), use of chemical attractants, poison fishing, and beach seining”.

Indeed, the interview reports above indicate that fish stability is a prerequisite for the COOPPAVI business and food security development in Rubavu District and countrywide at large. Therefore, efforts must be put in supporting and sensitizing the COOPPAVI members and customers to increase their income and savings that will help to alleviate and mitigate the chock of instability of food security.

IV.4. Challenges and suggestions

This section reports the respondents’ ideas in line with the third pre-set study objective of identifying the major challenges limiting the fishing cooperatives to fully contribute to the development of food security. In this regard, the previous literature showed that these limitations vary from one country to another. In context of fishing cooperatives in Rubavu District, the respondents’ interview and FGD reports established that COOPPAVI present different food security opportunities to its members and customers. However, the different challenges affecting the smooth running of COOPPAVI activities, and customers were highlighted. These challenges preventing COOPPAVI to achieve to its objectives include insufficient capital to run the cooperative business, insufficient and inappropriate equipment of fishing, subsistence and artisanal fishing practices, people illegal fishing and fishing malpractices.

In additional, the customers face also the different constraints related to the high price of fish, low availability and accessibility of fishes at the market, poor fish utilization and food security stability. Given these challenges, the Basic Need Theory contends that all the people must satisfy their basic needs. The attainment of these needs is a prerequisite for a healthy life. In the same context, food security is inevitably a human basic need. Therefore, fishing cooperatives needs the different policies, interventions and financial support in order to improve food security and nutrition, especially for vulnerable groups.

CHAPTER FIVE: SUMMARY OF THE FINDINGS, DISCUSSIONS, CONCLUSION

This chapter offers the summary of the key findings, discussions, conclusions and suggestions for further research.

V.1. Introduction

This study investigated the contribution of fishing cooperative (COOPPAVI) in the promotion of food security in Rubavu District. In view of that, the summary of key findings, discussion and conclusion were limited to this objective.

V.2. Summary of key findings

The first key finding focused on COOPPAVI activities and cooperative member welfare. The discussion with different focus groups and interviewees showed a range of COOPPAVI fishery activities and they were arranged into two classifications. The initial classification is fish production (fish farming and fishing), while the second category covers fish processing and trade. These activities have improved the cooperative members' welfare and food security.

The second key finding described the different dimensions of food security (Fish availability, accessibility, utilization, and the stability of food security particularly fishes). With this regard, the discussion from different FGD and interview reports disclosed revealed that fish availability in Rubavu District is reasonably moderate. The quantity of fishes at the market was reportedly inadequate and the price of fish at the market was reputedly expensive. The factors influencing this low availability of fishes at the market include traditional fishing practices, fishing harvest disruption resulted from illegal fish catch-up approach and inappropriate fishing tools used by clandestine fishers. Likewise, it was further reported the low level of fish accessibility however, the highlights marked by COOPPAVI in running a fishery business industry. Factors motivating this low level of fish accessibility were poor customers' affordability to buy fishes due to households' poverty, inequitable enforcement of policies and mechanisms regulating the transport of fishes to the markets in neighboring countries and countrywide, particularly fish distribution policies inconsistency in rural and urban areas. Indeed, the preferences to eat fishes were reportedly high and therefore increased the customer supply demands difficult to satisfy in principle of fish availability to the Market.

In addition, the food (fishes) utilization was also evaluated. Interviews and Focus Group Discussion from COOPPAVI members and customers emphasized on the nutritional value health status, food safety, fish preparation and consumption procedures. With this regard, it was recorded that fish utilization was satisfied. It was reported that the majority of respondents recognize the good quality of fresh and processed and they declared the importance of eating fishes in their respective families. Nevertheless, the respondents claimed the poor storage condition and preparation of fishes at home influenced by the customers' nature of ignorance and resistance to abide by the hygienic regulations.

Finally, findings disclosed that food (fish) stability is unpredictable in Rubavu District. The interview and the FGD with COPPAVI members revealed that sometimes COOPPAVI activities face temporary and seasonal food insecurity threats such as unfavorable weather conditions and clandestine illegal fishing that are likely to hinder the fishing production and/or affecting the people and cooperative sources of income.

The third key finding elaborates the challenges preventing the fishing cooperatives to run smoothly fishery activities and improve the food security. Some of the challenges identified by different respondents include insufficient capital to run the cooperative business, insufficient and inappropriate equipment of fishing, subsistence and artisanal fishing practices, people illegal fishing and fishing malpractices. In additional, the constraints affecting customers are related to the high price of fish, low availability and accessibility of fishes at the market, poor fish utilization and food security stability.

V.3. Discussions, recommendations, and conclusion

The contribution of fishing cooperatives on food security was undoubtedly recognized and established by both the COOPPAVI members and customers in Rubavu District. In this regard, fishing cooperatives conduct the different activities (fish production, processing and trade) to improve food security and welfare of the cooperative members and the population countrywide and abroad. Despite this contribution of fishing cooperative in promoting food security, the report from different sources (the literature, the study findings) criticized fishing cooperatives for failing to fully meet the food security requirements. Here, the literatures indicated that in Rwanda, the population experiences the challenges of food security (RCFSVA, 20015).

Similarly, 20% of households were in critical condition of food security (marginally food secure: household at high risk of becoming food insecure, food insecure, and severely food insecure). Southern and Western Provinces came at the top with more than 20% of households having unacceptable diets, particularly the Western Province had a higher percentage of households with unacceptable diets (FNSMS, 2015). This information was also confirmed by the findings of this research. In the same vein, the respondents' opinions reported the low availability and accessibility of fishes at the market, poor fish utilization and unpredictable security stability of fishes. Based on these interview reports and the literature, it is evidently obvious that the contribution of fishing cooperatives on food security in Rubavu District remains relatively moderate and needs improvement. This ineffectiveness results probably from the poverty and the lack of fishing facilities and technology.

In addition, the respondents' arguments went deeper and gave other causes, including insufficient capital to run the cooperative business, insufficient and inappropriate equipment of fishing, subsistence and artisanal fishing practices, people illegally fishing and fishing malpractices, and the lack of international and national enforcement policy supporting the implementation of the different food security dimensions (food availability, accessibility, utilization and food security stability). Indeed, fishing cooperatives need policies, interventions and financial support in order to improve food security and nutrition. In contention of the basic Need theory, people have the right to the basic needs (physiological needs: food security, and safety needs: security, safety). This theory contends that all the people obligation gratify their elementary desires. The contentment of elementary desires is a precondition for a "full-life" (Stewart 1985). In the same context, food security is inevitably a human basic need which in context of this study should be improved. Therefore, concerned institutions may take into consideration this issue and improve food security conditions in Rubavu District by providing more support to fishing cooperatives. Nevertheless, fishing cooperatives contribute to the development of food security through different fishery activities (fish production, processing and trading). Fishery activities create different opportunities such as employments, improving the cooperative members' welfare; providing food security and boosting the economy of the country. Therefore, the role of fishing cooperatives in the promotion of food security is undoubtedly critical.

V.5. Suggestions for further Research

The study findings identified some gaps preventing COOPPAVI to effectively improve food security in Rubavu District. Based on these loopholes that need improvement, this study recommended further research in different areas. In fact, fishing cooperatives was established with mission to improve food security in Rwanda. However, the study findings concluded that this objective was not effectively achieved (20% households are in need of food security). Therefore, it is suggested to conduct a study analyzing the challenges preventing fishing cooperatives to improve food security in Rwanda. Furthermore, the study findings recognized also the policies in place to protect fishery industry in their daily activities. However, some gaps in relation to implementation of these policies were observed (illegally fishing and fishing malpractices, the facultative implementation of policies enforcing on food security at international and national level). On this background, it is recommended to carry out a study assessing the effectiveness of policy framework regulating food security protection implementation in Rwanda

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APPENDICES

APPENDIX I: INTERVIEW GUIDE RESERVED TO COOPAVI MEMBERS

Sir/Madam

Food insecurity has become ubiquitous major threat to human security. In view of that, this study seeks to understand and collect your views and experiences in your neighborhood on the **“Fishing Cooperative and food security in Rwanda: The Case of COOPPAVI in Rubavu District.”**

Thus, this interview guide helps to collect data for the above mentioned objective. Feel free to express your opinions on the subject under investigation and elaborate on your answers as best you can as whatever, information you produce to us will be kept and treated with confidentiality and it will be exclusively used for the research purposes. Under no circumstances will such information be communicated to anyone else or any organization.

Section A-BACK GROUND INFORMATION

Answering each question please put a tick on the right answer which is most appropriate unless otherwise requested.

1. Kindly indicate your sex.

2.

Male []Female []

3. Kindly indicate your age group.

20-30 Years []

31 -40 Years []

41-50 Years []

51-60 Years []

Above 60 Years []

4. Indicate your Level of Education.

- PHD or Doctorate level []
- Masters level []
- Bachelor's Degree []
- Diploma level []
- Secondary level []
- Primary Level []
- No education level []

5. Are you a member of COOPAVI?

Yes [] No []

6. How long have you been in COOPAVI?

1-2 Years []

2-4 Years []

4-6 Years []

6-8 Years []

8-10 Years []

Above 10 Years []

SECTION B –CONTRIBUTION OF COOPAVI ON FOOD SECURITY

1. Does your family eat fishes?

Yea [] No []

How many times per week do you buy fishes?

.....
.....

2. How many kg of fishes does your family consume per week?

.....
.....

3. How much money do you pay to buy fishes per week?

4. How much money do you pay to buy 1kg of fishes?

.....
.....

5. Is this price affordable or expensive/high?

Yes [] No []

6. What is the distance do you cover to reach the market for fish?

.....
.....

7. Do you find fishes whenever you need it at the market?

Yes [] No []

8. Are you satisfied with the quality and storage condition of the fish you buy at the market?

Yes [] No []

9. If your answer is “No”, can you briefly explain why you are not satisfied with the quality and storage condition?

.....
.....

10. Ha ever any of your family members been sick due to eating fishes?

Yes [] No []

11. When you come back home from the market to buy fishes, do you prepare/cook them immediately?

Yes [] No []

12. If your answer is “No”, how much time do you usually have to wait before you prepare/ cook the fishes you have brought home?

.....
.....

13. If you don't cook the fishes immediately, how do you store or preserve them against the contamination?

.....
.....

14. Do you keep the fish fried or fresh before cooking?

.....
.....

15. As a member of COOPAVI, what is your occupation / job in COOPAVI?

.....
.....

16. Are you paid for this job?

17. Yes [] No []

18. How does the money you earn help you to take care of your family?.....

.....
.....

19. How has your life improved thanks to being a member of COOPAVI?

.....
.....

20. Does COOPPAVI face challenges/barriers preventing it to effectively run the fishing business in Rubavu District?

21. Yes [] No []

22. If your answer is “Yes”, what are these challenges?

.....
.....

23. What can you propose to COOPAVI leadership and members, partners and other clients with a view to overcoming these challenges, improve the current and sustainable cooperative objectives?

.....
.....

Thank you for answering this interview guide

APPENDIX II: INTERVIEW GUIDE FOR COOPAVI LEADERSHIP

Sir/ Madam,

This interview guide intends to collect the different opinions and views and important data that will help in compilation of report this research project investigating **“Fishing Cooperative and food security in Rwanda: The Case of COOPPAVI in Rubavu District.”** The Information you provide to us will be absolutely kept and treated with confidentiality and it will be exclusively used for the research purposes.

Section A-Back ground Information

1. Kindly indicate your sex.

Male [] Female []

2. Kindly indicate your age group.

20-30 Years []

31 -40 Years []

41-50 Years []

51-60 Years []

Above 60 Years []

3. Indicate your Level of Education.

PHD or Doctorate level []

Masters level []

Bachelors Degree []

Diploma level []

Secondary level []

Primary Level []

No education level []

4. Do you have any leadership position with COOPAVI?

Yes [] No []

5. If your answer is “Yes” what are your responsibilities?

6. How long have you occupied that leadership position?

1-2 Years []

2-4 Years []

4-6 Years []

6-8 Years []

8-10 Years []

Above 10 Years []

7. Are you a permanent employee? [] or a Temporary employee? []

SECTION –B: QUESTIONS ON COOPAVI CONTRIBUTION IN PROMOTING THE POPULATION FOOD SECURITY

1. How many customers buy COOPAVI products?

2. Do all customers come from Rubavu District?

3. Can you estimate the amount of fishes you sell per year?

4. What is the price of 1kg of fishes?

5. What is the weight of fishes you avail at the market per month?

6. Do you import fishes outside of Rwanda/from neighboring countries?

7. Can you estimate the number of people who buy your products in Rubavu District?

8. Are you able to provide the market with enough fish as needed by customers?

9. How does COOPAVI transport and store fish products before reaching the market?

10. What are the different opportunities offered by COOPAV in ameliorating the food security and welfare of cooperative members, citizens residing in Rubavu District and the neighborhoods?

11. Has COOPAVI achieved its objectives of improving food security and human security of its members and citizens? If yes, how, and if not, why?

.....
.....

12. What challenges has COOPAVI experienced in their efforts to promote food security in Rubavu District?

13. What would you suggest to COOPAVI leadership and members, partners and other clients with a view to overcome these challenges and improve the current and sustainable cooperative objectives?

Thank you for your contribution in answering this interview guide

APPENDIX III: QUESTIONS RESERVED TO COOPAVI SERVICE CUSTOMERS

Sir/ Madam,

This interview guide intends to collect the different opinions and views and important data that will help in compilation of report this research project investigating the **Fishing Cooperative and food security in Rwanda: The Case of COOPPAVI in Rubavu District**. The Information you provide to us will be absolutely kept and treated with confidentiality and it will be exclusively used for the research purposes.

Section A-Back ground Information

1. Kindly indicate your sex.

Male [] Female []

2. Kindly indicate your age group.

20-30 Years []

31 -40 Years []

41-50 Years []

51-60 Years []

Above 60 Years []

3. Indicate your Level of Education.

PHD or Doctorate level []

Masters level []

Bachelors Degree []

Diploma level []

Secondary level []

Primary Level []

No education level []

4. Are you a client of COOPAVI products?

Yes [] No []

5. If your answer is “Yes” how long have you been COOPAVI customer?

1-2 Years []

2-4 Years []

4-6 Years []

6-8 Years []

8-10 Years []

Above 10 Years []

SECTIO B: SQUESTIONS ON COOPAVI CONTRIBUTION IN PROMOTING THE POPULATION FOOD SECURITY

6. Does your family eat fishes?

Yes [] No []

7. How many times per week do you buy fishes?

.....
.....

8. How many kg of fishes does your family consume per week?

.....
.....

9. How much money do you pay to buy fishes per week?

10. How much money do you pay to buy 1kg of fishes?

.....
.....

11. Is this price affordable or expensive/ high?

Yes [] No []

12. What is the distance do you cover to reach the market for fish?

.....
.....

13. Do you find fish whenever you need it at the market?

Yes [] No []

14. Are you satisfied with the quality and storage conditions of the fish you buy at the market?

Yes [] No []

15. If your answer is “No”, can you briefly explain why you are not satisfied with the quality and storage conditions?

.....
.....

24. Has ever any of your family members been sick due to eating fishes?

Yes [] No []

16. If you don't cook the fishes immediately, how do you store or preserve them against the contamination?

.....
.....

17. Do you keep the fish flied or fresh before cooking?

.....
.....

18. Have you faced the challenges with COOPPAVI when going to buy the fishes?

Yes [] No []

19. If your answer is “Yes”, what are these challenges?

.....
.....

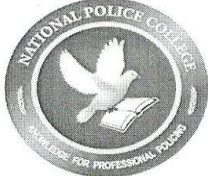
20. What are the suggestions can you propose to COOPAVI leadership and members, partners and other clients with a view to overcome these challenges and improve the current and sustainable cooperative objectives?

Thank you for your contribution in answering this interview guide

APPENDIX IV

RWANDA NATIONAL POLICE

Musanze, 17 DEC 19



NATIONAL POLICE COLLEGE

TEL: (+250)788311956

P.O.BOX: 23 Musanze

E-mail: npc@police.gov.rw

TO WHOM IT MAY CONCERN

This is to confirm that **CSP KANYAMIHIGO RUTAGARAMA** is a student of Rwanda National Police College, undertaking a Master's Degree in Peace Studies and Conflict Transformation for the academic year 2019-2020. He is conducting a research on: "*CONTRIBUTION OF FISHING COOPERATIVES ON FOOD SECURITY. A CASE OF COPAVI IN RUBAVU DISTRICT*", for which he is required to collect data from relevant sources.

Any assistance rendered to him in this regard is highly valued by this College.

F NTIRUSHWA
CP
D/COMMANDANT



APPENDIX V

INTARA Y'UBURENGERAZUBA
AKARERE KA RUBAVU
Coopérative pour la Promotion de Pêche
et des Activités de Ventes d'Isambaza (COOPPAVI)

Rubavu, Kuwa 12 Gashyantare 2020

IMPAMVU: Kuwo ari we wese ubifitwe ububasha

Twebwe abanyamuryango ba COOPPAVI, ikorera mu Karere ka Rubavu, tumejeje no kumenyesha ko nyuma yo kubona ibaruwa ya Kanyamihigo Rutagarama umunyeshuri muri Kaminuza y'u Rwanda, isaba kugirana ikiganiro nawe mu rwego rw'ubushakashatsi arimo gukora ku ruhare rw'amakoperative y'uburobyi mu Rwanda mu kuzamura imibereho myiza y'abaturage mu kwihaza mu biribwa; twemeye kugirana icyo kiganiro nawe kubushake bwacu ntagahato cyangwa ikindi gitutu icyo aricyo cyose dushyizweho.

Murakoze

ABAHAGARARIYE ABANYAMURYANGO:
AMAZINAUMUKONO

1. *Sayimanzanye Jeanne Diane* presidente *JDF 072 61 80 670*
2. *Muyitegeka Sadiath* *Munyuzi*
3. *Mwimaza Shera* *Munyuzi*
4. *Mukanyanga Ruba* umunyamuranga *Munyuzi*
5. *MUTONI MWASUMA* *Munyuzi*
6. *MUKUNDIYUKURI Didace* Member *Munyuzi*



Abanyamuryango
Executive Secretary

