

**THE ROLE OF SUBSISTANCE FARMING COOPERATIVES IN IMPROVING
RURAL HOUSEHOLD FOOD SECURITY: THE CASE OF MWENDO SECTOR,
RUHANGO DISTRICT/RWANDA**

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Abstract

Agricultural cooperatives play an important role in rural Rwanda as the country is one of the most densely populated countries in Africa and the majority of population relies on subsistence smallholder farming. Agricultural cooperatives have been regarded as a way of promoting smallholders, particularly subsistence farmers, where collective operations can increase agricultural production for a household. But although research indicates many factors affecting cooperative development and agriculture productivity these factors are not the same in every country. This study investigated the role of agricultural cooperatives in improving household food security and factors contributing to the success of smallholder agricultural cooperatives. It is expected that isolation of benefits of agricultural cooperative members in food security and the factors influencing production may assist government and other institution dealing with food security in plans and decisions to support smallholder farmers.

The study randomly selected three registered rural agricultural cooperatives in Mwendo Sector growing pineapples, peas and maize. The research sample size of 150 cooperative members' and 20 non-cooperative members was used to explore the agriculture cooperative in Rwanda, factors influencing production in agricultural cooperative and benefits of belonging or not belonging in a cooperative in Rwanda. Data were collected through questionnaires. In order to complement the quantitative data and results of the study, focus group discussions and key informant interviews were also used to appraise these research questions. A cross-cutting conceptual framework for measuring effectiveness of agricultural cooperatives was elaborated using literature review and it was used for comparative analysis as effectiveness of the assessed cooperatives.

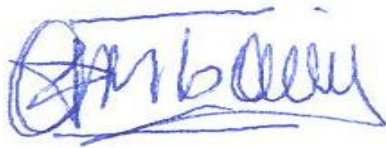
The results revealed that cooperatives possess the same organizational structure, only differences are found in internal organization. The study further found that the factors influencing productivity of agricultural cooperative are equipment used in agriculture, training received by cooperative members, cooperative organization, government assistance and extension officer services, inputs used in production, marital status of members, age and level of education of cooperative members. From the findings it was found that cooperative members benefit from cooperative income, government assistance and skills from cooperative training in agriculture. Other benefits found are increase of production and market of cooperative produces through cooperation and promotion of culture and unity in the locality through various social and religious activities within cooperative members.

Research recommends the government and its stakeholders to sensitize so that every smallholder should belong to the cooperative for the sake of helping them in groups. Government should facilitate cooperatives use of improved equipment and inputs through offering intensive trainings on financial management, agriculture and animal husbandry which augment production. Government also should ensure affordable bank credit rate to cooperative farmers, provide improved seeds to the farmers and avoid delay of delivery. On the other side, cooperative members should be determined, investing in cooperative and dealing with challenges in order to be self-reliance as a way of fighting against food insecurity.

Declaration

I, Sylvestre Mbanza declare that:

- The work presented in this mini-dissertation, except where otherwise indicated is my original work
- This mini-dissertation has not been submitted for any degree or examination at any other university
- This mini-dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from those persons
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Signed: ... Date: 10 March 2014

Sylvestre Mbanza

As a Research Supervisor, I agree to submission of this mini-dissertation for examination.

Signed:Date:

Dr Joyce Chitja

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List of abbreviations

AfDB: African Development Bank
 AIDS: Acquired Immuno- Deficiency Syndrome
 COAGRIMA: Cooperative des Agriculteurs de Maïs
 COCUANGA: Cooperative des Cultivateurs d’Ananas de Gafunzo
 COPALE: Cooperative des Agriculteurs des Legumes
 FAO: Food and Agriculture organization
 FHI: Food for the Hungry International
 GDP: Gross Domestic Production
 RoR: Republic of Rwanda
 HESM: Household Expenditure Survey Method
 HIV: Human Immunodeficiency Virus
 IFAD: International Fund for Agricultural Development
 ILO: International Labour organization
 IPAR: Institute of Policy Analysis and Research
 MDGs: Millennium Development Goals
 MINICOM: Ministry of Industry and Commerce
 NGO: Non-Government organization
 NISR: National Institute of Statistics of Rwanda
 RCA: Rwanda Cooperative Agency
 SACCO: Savings and Credit Cooperative Organization
 SC: Sector Census
 SPSS: Statistical Package for Social Sciences
 UN: United Nations
 USA: United States of America
 VUP: Vision 2020 Umurenge Programme
 WB: World Bank

Chapter One

Introduction and research problem

1.1 Background of the study

Rwanda is a small, landlocked country situated in the Great Lakes region of East Africa. It covers an area of 26 338 square kilometres with population of 10,537, 222. Rwanda is among the most densely populated countries in Africa with 416 people/km², and the average annual growth rate on national level is 2.6 per cent (NISR, 2012). Approximately 60 per cent of Rwandans lives in rural areas and the poverty rate is moderately high (NISR, 2012). Rwanda has four neighbouring countries: Burundi in the South; Tanzania in the East; the Republic Democratic of Congo in the West and Uganda in the North (NISR, 2010).

Agriculture is a prime economic sector in Rwanda providing 90 per cent of employment opportunities in the country and 70 per cent of export revenue. The national food provision situation is that 91 per cent of domestic food is supplied by the domestic agricultural sector. Sixty-six per cent of total crops cultivated in the country are domestically consumed and in 34 per cent of agricultural production is market oriented (IPAR, 2009).

On the basis of these statistics it was decided in 2005 to institute a system of cooperatives as tool for poverty reduction and this is expected to play a key role in mobilizing rural people to contribute to the development of the country (Mukaruziga, 2010). The role of cooperatives in national socio-economic development is recognized in Law No. 50/2007 of 18/09/2007 which determined the establishment, organization and functioning of cooperative organization in Rwanda. The vision of the Rwanda Cooperative Agency (RCA) established in 2008 is to promote an autonomous and economically viable cooperative movement founded on the cooperative values and principles and is able to enhance social integration and uplifting the standard of living of its members (RoR, 2011).

Mwendo Sector is one of nine sectors in Ruhango District which is one of thirty Districts in Rwanda. According to the Sector census (2010), Mwendo Sector covers an area of 5,555 km² and has about 23,213 inhabitants with 12,023 female and 11,190 male. Average Sector population density is 417/km² and there are 5,036 households. The ratio of females-headed households to males-headed households is 1258:3278. Most frequently cultivated crops are cassava, maize, bean, pineapple, rice, etc (RD, 2010).

1.2 The problem and its roots

Food insecurity is intertwined with poverty. The World Bank Annual Report (2010) explains that the global financial and economic crisis particularly afflicts developing countries, with some 64 million more people in the developing countries expected to fall into poverty, defined as people living on less than \$1.25 a day. In addition, in 2012 a total of 870 million people were undernourished in terms of dietary energy supply and 852 million of these live in developing countries; this figure represent about 12.5 per cent of worldwide population, or one person in eight (FAO, 2012b).

Rwanda is classified as a developing country and the majority of Rwandans depend on small scale subsistence agriculture for their livelihoods (NISR, 2012). These small scale farmers, who are the majority of the population, face numerous challenges among which are inadequate education which precludes access to markets or bargaining on prices, soil erosion which sweeps away both fertile soil and planted crops during rainy season, and lack of mechanization which leaves smallholders reliant solely on rainfall. In addition, high population density inversely reduces land per household which in turn reduces agricultural production (Huggins, 2012).

As food insecurity and poverty are interlinked, poverty incidence is higher in rural areas than in urban areas, with 66 per cent incidence in rural areas against 11 per cent in Kigali (capital city) and 18 per cent in other cities (AfDB, 2008).

The government of Rwanda sees cooperatives as an important tool for alleviating poverty and food provision; they are expected to play a significant role in raising incomes and helping to reduce poverty. As RoR (2011) explains, the economy of Rwanda is heavily dependent on agriculture, which provides livelihood for 84 per cent of the population. Agriculture accounted for 31 per cent of gross domestic product (GDP) in 2010–2011, with production per household of roots and tubers growing by 10.6%, cereals by 7.5%, cassava by 7.4%, and vegetables and fruits by 4%. In addition, both livestock and fisheries grew by 3% (RoR, 2011).

The Government of Rwanda has encouraged the cooperatives, and the Mukaruziga (2010) notes that agricultural cooperatives make direct and indirect contributions to socio-economic development of the population through promoting and supporting productive employment and entrepreneurial development, enhancing social inclusion (through income generation,

housing, reduction of family conflicts), strengthening social protection and community building. There is therefore need to conduct an assessment on the contribution of agricultural cooperatives to household food security: investigating their role in providing food for the household, the factors that influence production by an agricultural cooperative, and the reasons why some Rwandans prefer to join cooperatives and others do not.

1.3 Problem statement

In their current form and structure; do agricultural cooperatives in Rwanda assist in improving food security? Effectiveness in this research is defined and limited to an enabling structure and internal capacity to result in improved income generation.

1.3.1 Sub-problems

In this research study the following sub-problems are undertaken in order to attain the role of agricultural cooperative in household food security and the factors contributing to the success of a cooperative.

Sub-problem 1: How are agricultural cooperatives structured in Rwanda?

Sub-problem 2: What are the factors influencing effectiveness in production in agricultural cooperative in Rwanda?

Sub-problem 3: What are the benefits of belonging or not belonging in a cooperative in Rwanda?

1.4 Objectives of the study

The main purpose of this study was to explore the effectiveness of agricultural cooperatives in improving production, income (food and monetary) of farmers and explore implications for food security.

The specific objectives of the study are:

- To assess the role of an agricultural cooperative in providing food supply to a household
- To determine the factors supporting the success of an agricultural cooperative
- To establish why some people join cooperatives and other do not

1.5 Study limits

There are many different kinds of functioning cooperatives throughout Rwanda but this study confined its investigation to agricultural cooperatives growing pineapples, peas and maize in a single local municipality (Mwendo Sector) and recognized by the Mwendo Sector Department of Economic Development and Cooperatives. Small-scale farmers analyzed were those who owned land less than 0.5ha and cooperated to increase production. The localized research setting means that the results are not to be regarded as representative of the country as a whole.

1.6 Outline of dissertation

The study consists of seven chapters: Chapter 1 is dealing with background, problem statement, objectives, study limits, and significance of the study. Chapter 2 is a review of literature pertaining to the agricultural cooperative and food security issues. Chapter 3 illustrates the characteristics of cooperative effectiveness. Chapter 4 describes the study area in which selected cooperatives were clarified as well as samples characteristics of respondents. The fifth chapter outlines the methodology used in carrying out this research, including description of the study area, sampling procedures, data collection and data analysis. The results of the study as well as their interpretations are presented in Chapter 6. The final chapter presents conclusions and policy recommendation indicated by the study.

1.7 Importance of the study

In small, landlocked Rwanda about 90 per cent of the employment opportunities are found in agriculture, and the majority of farmers in Rwanda do it for self-consumption (NISR, 2012). Rwanda's agricultural productivity has been low, and in view of the fact that 91 per cent of domestic food is provided by agricultural sector, government has promoted cooperatives as a way to boost employment, income per capita and Gross Domestic Product (GDP), with appropriate consideration given to environmental protection and income equity.

In addition, it is envisaged that agricultural cooperatives will improve food production and accessibility for households. The study accordingly set out to gather and evaluate relevant information that will identify the role that agricultural cooperatives play in household food security enhancement and indicate why some people choose to join an agricultural cooperative and others do not.

Fuller understanding of the role of agricultural cooperatives in rural Rwanda as exemplified by pineapple, peas and maize cooperatives in Mwendo Sector would be of value to government bodies, donors and agricultural decision makers. Furthermore, findings of this study will provide insight for researchers and students interested in related areas for further research.

Chapter Two

Literature review

2.1. Introduction

Agriculture is a primary source of employment and income in rural areas where agricultural cooperatives also play a role in rural agricultural development (Tripathy, 1998). The Rwanda Cooperative Agency (RCA, 2011) accepted the International Cooperative Alliance (ICA) definition of a cooperative as “an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise, according to internationally recognized co-operative values and principles”. A cooperative differs from a conventional business in that a cooperative is formed to fulfil its member’s needs and is democratic in ownership and control, in its way of working and in its legal structure. Cooperatives in the context of agriculture provide genuine money-making benefits to farm families, especially poor farmers, through strengthening the situation of the farmer in the agro-food chain, improving market access for farmers’ products, and allowing rural people to sort out their own solution (Allahdadi, 2011).

As pointed out by Echevarria (1998), agricultural production mainly depends on three factors of production – land, labour and capital – and the failure of any one factor affects the production. To improve agricultural production, these factors need to be improved: Soil (land) needs inputs like fertilizer, improved seed, and chemicals for better agricultural production (Ortmann & King, 2007); availability of trained labour as well as improved hand tools help to foster good agricultural practices and agriculture production (Mushobozi & Santacoloma, 2010); financial means is required in agriculture particularly in the form of credit for small farmers which acts as catalyst in rural small farming production (Okon, *et al.* 2012). Akudugu *et al.* (2012) argue that for farmers, access to credit and extension services are both important factors that help households to decide on technology adoption, hence they improve agricultural production. Equally important, the farmers need to get access to the market for selling their farm products, and this is facilitated by infrastructure that links the producer to the consumer where the price is fair (Senyolo *et al.* 2009). As reported by Rosegrant *et al.* (2005), in the case of Rwanda, national government together with donors supported farmers’ groups by providing credit, farm inputs and crops, and was found to be successful as vehicle for both agricultural production and rural development.

Worldwide, 70 per cent of the world's poor live in rural areas and get their income and employment from agriculture (WB, 2013). To increase agricultural production, rural mass participation (agricultural cooperatives) and natural resources protections are required (Hekmat, 2011). Agricultural cooperatives help in the provision of four essential services to the cooperative's members: farm guidance, input supply services, credit services and market services (Prakash, 2005). Agricultural cooperatives also help small farmers to send their children to school, afford health insurance, earn income, and be able to construct their houses. Also, through cooperatives small farmers' access training and skills in doing business and participating in democratic debate (Chambo, 2009).

Despite the positive contribution of agricultural cooperatives to social and economic development, a cooperative enterprise faces many challenges, including globalization, political interference and poor management (Zamagni & Zamagni, 2010). Particularly in Rwanda, agricultural cooperatives face difficulties such as small land parcels, lack of credit, lack of effective management structure, market prices that do not correspond to the effort of producers, and lack of entrepreneurial skills (Chuhan-Pole & Angwafo, 2011).

This literature review chiefly considers publications pertaining to agricultural cooperatives where the emphasis is on development of agriculture. The chapter also discusses the origin of cooperatives, their production and structure, particularly in regard to primary cooperatives, and the historical background of cooperatives in Rwanda. Factors contributing to the increase in the number of agricultural cooperatives will be presented, highlighting factors enhancing agricultural production. This is followed by an account of the challenges to agricultural production in relationship to cooperatives. The benefits of agricultural cooperatives to the farmers, particularly small-scale farmers (small-scale farmers, smallholders and subsistence farmers are interchangeable terms) will be explained by using evidence from empirical studies. Attention will also be given to reasons why some people do not want to join cooperatives.

2.2 Origin of co-operatives

Not much is known about the origin of cooperatives, especially informal cooperatives, as they go far back in human history; it is natural for people to work together for achieving something which benefits them, especially for economic development (Sargent, 1982). Agricultural cooperatives have existed for thousands of years and there is evidence that they

existed in the Babylonian era in surviving agricultural charters that have cooperative features (Roy, 1964). In the United States, cooperatives originated in the colonial period when they primarily operated for the benefit of farmers. The oldest recognized cooperative business in the United States was established in 1752 by Benjamin Franklin and is still carrying on its activities (Zimbelman, 2007).

Agricultural cooperatives were first formed in the United States in 1858 in the state of Illinois, begun by agricultural producers facing tough economic conditions due to monopolistic control by middlemen (non-producers). The farmers met at Centralia and decided to form an organization to get more voice than the non-producers, specifically on price determination. This brought together producers and consumers by discouraging middlemen and they were able to cope with the existing conditions (French *et al.* 1980). The economic distress was found again in the late 1860s when a general farm organization called “Grange” actively promoted cooperative enterprises, and in 1874 the annual convention of National Grange adopted the Rochdale Principles as an operational guide for an organization where farmers have opted to work together in regard to buying and selling, and more generally for mutual protection and advancement (Shannon, 1945). The first law pertaining to cooperatives was passed in Michigan in 1965 (French *et al.* 1980).

Equally important, in Europe informal agricultural cooperation began a long time ago, but formal agricultural cooperation in Britain started in 1867 and were established by the Agricultural and Horticultural Association. All co-op societies relied for their success on provision of capital, provision of skills and support for their society in difficulties situations (Sargent, 1982).

The evolution of cooperatives around the world accelerated during course of the nineteenth century and today worldwide patterns and structures of cooperatives vary depending on how they began and how they subsequently developed (Smith, 2004). However, the development that had particularly important impact on worldwide cooperatives, and is seen as birthplace of the cooperative movement, was the Rochdale Society of Equitable Pioneers. Founded in Britain in 1844 the Rochdale Society first set out the underlying principles of cooperatives and the same principles continue to guide cooperatives today (Ortmann & King, 2007).

In Africa, cooperation has a long history dating back to pre-colonial times. As pointed out by Wanyama (2013), many countries on the African continent had a traditional culture of

cooperation, especially in agriculture and credit, but agricultural cooperatives predominated due to their role in the economic activities of communities. In the colonial period, the colonial governments introduced and shaped the system that fostered the cooperative movement in the colonized countries and they used cooperatives as an administrative approach in the implementation of socio-economic policies (Wanyama *et al.* 2009). The cooperatives formed were mainly in the agricultural sector, intended to help small and commercial farmers in the production of cash crops like coffee, cocoa, tea, cotton and other export commodities. Cooperatives were thus linked to the export production strategies of the colonial authorities rather to the marketing strategies of members (Deletere *et al.* 2008). In post-colonial Africa, agricultural cooperatives were widely promoted with the aim of socially organizing the countryside. Also, cooperatives had to serve two goals: organizing smallholders into bigger, productive firms and facilitating the development of the state (Mangnus & Piters, 2010).

2.2.1 Historical background of cooperatives in Rwanda

Historically, Rwandan society was organized according to a philosophy of working together in solidarity for improvement of the social structure. The purpose of this unity/solidarity was mainly to ensure common protection, take care of conflict management and provide mutual assistance to one another. The evidence of this working together in the Rwandan community is to be found; firstly, in the daily productive activities of the population where during crop planting one could call on the neighbours' assistance in cultivating a field. This is known as *Ubudehe* and it was organized and done on ad hoc basis without waiting for any payment. Secondly, people organized mutual-aid associations known as *tontines* or *Ibimina* and these *ibimina* took various forms including labour pools and produce pools (ILO, 2008).

Similar to most African countries, in Rwanda cooperatives existed before the colonial era but were shaped and encouraged by the Belgians in the colonial period (RCA, 2011). This was done as an instrument for attaining the socioeconomic goals of the colonizer. The primary emphasis was on cooperatives producing export commodities like coffee, tea, and on mining production. The structure of cooperatives reflected the colonial administrative structure. During this period the cooperative movement underwent little growth due to the fact that they were controlled by the colonial administration who forced the population to produce what the authorities preferred by fixing the price that cooperatives could pay their members for their

produce. These prices were lower than the value of the work done or the export prices (Wanyama, *et al.*, 2009).

Since the independence of Rwanda in 1962, the number of cooperatives has increased due to the support of the movement by the new government. Table 1 below shows that cooperatives rose from 4 pre-1962 to 1528 in 1983.

Table 2- 1 Number of cooperatives in Rwanda

Period	Number of cooperatives
Before 1962	4
1962-1966	36
1967-1973	423
1974-1980	1203
1981-1983	1528

Source: Mukaruziga, 2010

The Rwanda genocide against Tutsi in 1994 destroyed the country including the cooperatives (Ansoms, 2005). After the Rwandan genocide cooperative reform was adopted as national policy and promotion of cooperatives was established by law in 2008 with the aim of promoting a vibrant cooperative movement country-wide. According to RCA (2011), primary cooperatives unify and give rise to secondary cooperatives/unions, and all types of cooperatives need to unite in a combined national endeavour.

The characteristics of a cooperative in terms of ownership, shares, liability, voting rights, reporting requirement and registration process are summarized in Table 2.2 below.

Table 2-2 Cooperative characteristics in Rwanda

Critical component	Cooperatives
Ownership	Owned by at least seven people and open to the number of people who may join. No ceiling.
Shares	The number of shares is determined by the General Assembly and this is well stated within the Bylaws. A member may have as many shares as they wish.
Liability	The liability of the members is limited to their shares and they are not called upon as individuals to settle the debts of the cooperative.
Reporting requirement	Required by law to file annual returns with full disclosure
Decision Making / Voting Rights	General Assembly makes decisions – one member one vote.
Registration Process	Apply and acquire a certificate of registration form: Rwanda Cooperative Agency

Source: RCA, 2011

In 2005 the Taskforce on Cooperatives Promotion was formed and conducted a survey which showed that about 12,934 cooperatives and cooperative-like organizations are operating in the country. Interestingly, most of them were primary cooperatives and their production is centred in the agricultural sector where 68.7 per cent of cooperative organizations are identified (Mukaruziga, 2010)

Table 2.3 below shows the cooperative organizations registered in 2008 with the ministry in charge of cooperatives (MINICOM) identified in agricultural sector in Rwanda. This table illustrates also shows categories, sub-categories, the number of cooperatives and number of cooperative members.

Table 2-3 Cooperatives registered for agricultural activities in Rwanda, 2008

Categories	Sub-categories	Number of cooperatives	Number of cooperative members
Agricultural cooperatives	Coffee	113	19096
	Maize	71	14524
	Household production	67	8711
	Rice	60	23100
	Rice vegetables	60	6175
	Horticulture	52	682
	Fruits	49	4445
	Cassava	46	5030
	Potatoes	41	4252
	Other cash crops	36	3677
	Bananas	15	1623
	Wheat	13	2809
	Pyrethrum	9	769
	Sugarcane	6	428
	Tea	4	4608
Livestock cooperatives	Cows	59	3413
	Beekeeping	47	2971
	Small livestock	35	2667
	Fishery	5	314

Source: Mukaruziga, 2010

2.3 Definitions of cooperatives

Various definitions have been offered as to what a cooperative is. For Bottomley (1979) the term *cooperative* signifies “working together”, where a group of people achieve the objectives that an individual alone cannot attain. It is a form of business that owned and controlled by the people who agree to join and accept compliance with five principles (rules) during operations: (i) open and voluntarily membership, (ii) democratic control, (iii) limited interest on share, (v) fair distribution of surplus (profit), and (vi) promotion of education.

As defined by the FAO (2012a), a cooperative is an association of men and women who are voluntarily joined together to form an enterprise generating profit. The enterprise formed is democratically controlled by the cooperative members and has the objectives of lifting their members out of poverty by sustaining them in the attainment of shared social, economic and cultural benefits.

Davies and Mills (2013) describe a cooperative as “an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise”. They add that cooperatives are based on principles of self-responsibility, self-help, democracy, equity, equality and solidarity.

As explained by Ortmann and King (2007), cooperatives operate under the guidance of core principles which act as roots of cooperatives. Cooperative guiding principles are presented in Table 2.4.

Table 2-4 Core principles of cooperatives

-
- Voluntarily and open membership
 - Democratic member control
 - Member economic participation
 - Autonomy and independence
 - Education, training and information
 - Cooperation among cooperatives, and
 - Concern for community.
-

Source: (Ortmann and King, 2007)

The members of any cooperative have to understand these principles before creation of the cooperative. Equally important, these principles elucidate the difference between a cooperative and an investor-owned company or business enterprise.

According to the Mukaruziga (2011), there are different categories of cooperatives in Rwanda which can be classified as primary, secondary, tertiary and apex. This research focuses on primary cooperatives.

2.3.1 Levels of cooperatives

Basically, there are three levels of cooperatives: primary cooperatives, secondary cooperatives (also termed *unions*) and tertiary cooperatives. An agricultural cooperative is any form of cooperative that produces process or markets any agricultural product and provides services as well as inputs to the cooperative members (RSA, 2008).

Primary cooperative: A cooperative is considered to be primary when it is made up of individual persons as members. The aims of a primary cooperative are for the members to

provide services, production and employment for one another. This form of cooperative exists at local level (FAO, 2012a).

Secondary cooperative: This level of cooperatives, also known as cooperative unions, is usually formed by a grouping of primary cooperatives which are its members. They come together because they are involved in the same activities and provide services to their members. Most secondary cooperatives function at district or regional level (Tchami, 2007).

Agricultural cooperatives may be organized in a variety of ways according to their particular function; these can include production cooperatives, supply cooperatives, service cooperatives, agricultural marketing cooperatives and purchasing cooperatives (Laming, 1984).

2.3.2 Challenges faced by primary cooperatives

All primary cooperatives provide many services to their members, and agricultural cooperatives in particular offer multiple services to the farm households (FAO, 2011). However, the greatest challenge for primary cooperatives, especially in developing countries, is lack of access to capital (French, et al., 2012). In Rwanda, Nyensiga (2012) states that lack of access to credit facilities precludes farmer cooperatives from buying inputs like fertilizer which is critical in agricultural production, and that this is associated with management problems in cooperatives that make the banks shy away.

Moreover, Nwankwo *et al.* (2012) noted that difficulties that prevent cooperatives from maximizing business promotion activities include lack of management and leadership skills, lack of training/educational opportunities, lack of adequate funds and illiteracy among cooperative members. A study conducted in Kenya by Fischer and Qaim (2011) found that within farmer groups, a low rate of participation in joint activities is a challenge that can critically threaten their success and viability; free-riding can exist but this is attributed to institutional and organizational factors like timing of payment and group size.

Despite the challenges facing primary cooperatives which have a negative effect on production, cooperatives nonetheless play a significant role in social, economic and political development. They create opportunities and provide incomes to their members, together with services such as education, health care and creation of employment (Mukaruziga, 2010).

2.4 Challenges in agricultural production and the relationship to cooperatives

The level of crop production is determined by various interacting factors in the farming system such as environmental fluctuations, natural resources (water, temperature, fauna and flora), traditional practices, government policies like land tenure, marketing, animal welfare, and labour relations (IFAD, 2011). Agricultural cooperatives can resolve or mitigate many problems facing farmers, particularly smallholder farmers (Chambo, 2009).

2.4.1 Linkages between land, labour and agricultural cooperatives

Land has been reported to be a crucial productive resource for farmers (Anim, 2011), but increase in crop productivity will depend on how efficiently land is utilized (Carvalho and Batello, 2008). In Africa, a large proportion of farmers are subsistence farmers with small farm holdings ranging from 0.5 hectare to about 4 hectares. These small-scale farmers face a number of obstacles in seeking to increase their income and improve their livelihoods. Resilience is therefore important to insure household food security (Odoemenem and Adebisi, 2011). A study conducted in Ghana by Akudugu *et al.* (2012) notes that whereas small farm size is associated with low agricultural production, small land holdings can nevertheless provide high production when modern agricultural production technologies are adopted. In addition, a study conducted in Kenya by Ngugi and Kariuki (2009) found that smallholder farmers' organizations provide trainings which enable their members to improve production and marketing of crop and livestock commodities. Research by Clark (2012) on population growth and deforestation in Madagascar argues, on the other hand, that population growth, especially in developing countries, results in deforestation which reduces agricultural production. Increases of population without technology raises energy needs for cooking and other activities, increases food consumption and causes further plot division. Resulting, deforestation and land degradation occur accelerates global warming and reduces the availability of arable land, with negative consequences for agricultural production.

A variety of causes have been identified for failure of poor small-scale farmers working their own land using labour from their own households for production (IFPRI, 2007). Poor nutrition status or ill health can result in lower food production by a smallholder (Kropf *et al.* 2007). A study conducted by Daudu, *et al.* (2009) in Makurdi Local Government Area of Benue state in Nigeria on the role of youth in agriculture development established that although youth constitute an important source of agricultural labour they tend not to become involved in agriculture, and the main reasons inhibiting their participation are lack of

commitment, lack of logistic support and lack of land ownership. Conversely, producer cooperatives can be one way of integrating people in agriculture, involving them in decision making and motivating them to take responsibility for their actions (Mangnus & Piters, 2010).

Human diseases like HIV/AIDS can be a major cause of labour shortage for small-scale farmers' dependant on agriculture as their only means of household food production (Musinguzi, 2012). Primary production drops and household members seriously suffer when a productive member of the household falls sick or dies, and the whole family becomes more vulnerable to hunger. The most frequent cases are observed in HIV/AIDS-affected families or child-headed households. All of these conditions keep small-scale farmers in a state of poverty and, particularly, of food insecurity (Yasmeen, 2011). In Swaziland, a study conducted by Masuku and Sithole (2009) sought to identify the impact of HIV/AIDS on food security and household food vulnerability. They concluded that the disease was detrimental to agricultural labour and production, and resulted in the selling household crops and livestock to finance healthcare and funerals, thus increasing the vulnerability of household to food insecurity. Mukaruziga (2010) argues, however, that awareness of HIV/AIDS and antiretroviral drug distribution more easily reaches cooperative members since they are together. In Rwanda for example, cooperatives are used as a channel for HIV/AIDS awareness and protection campaigns; cooperative members are sensitized and trained about HIV/AIDS and this reduces infection, brings hope to HIV/AIDS-infected people and increases production.

2.4.2 Agricultural inputs and education

Another reason for failure of small scale farmers is their limited production capacity when confined to working with simple manual implements like hoes, spades, axes, machetes, etc. The other drawback is that the farms are very small (FAO, 2001). According to Muzari *et al.* (2012), adoption of more advanced agricultural technologies in sub-Saharan Africa can raise the agricultural production of smallholders. Examples of these technologies (Houssou *et al.* 2013) include:

- crop breeding to promote high yielding plant crop varieties
- weed control resulting in a considerable increase in production

- soil and water management that prevents soil erosion, deforestation, soil salinity and acidity, and improved soil fertility and water availability, and, the use of low-cost or small tractors and other machines to facilitate the agricultural activities operate efficiently for smallholders to boosting up their production

Some of these problems facing smallholders can, however, be resolved in agricultural cooperatives. According to the FAO (2012a), pooling resources helps cooperative members to access techniques and technologies that provide sustainable agricultural production, and cooperatives also increase their members' ability to bargain and negotiate in reducing expenses such as training fees and bulk buying costs.

Education and frequent visits of extensions agents to train farmers on how to use machines, and making it possible for smallholders to access and afford machines and other agricultural equipment, are important for increasing smallholder agricultural production (Owombo *et al.* 2012). Equally important are short-term crop intensification training programmes, technical/vocational education programmes and extensions delivery systems supported by information communication technology; all these can raise smallholders' farmers technical and productive capacity (Nyagaka *et al.* 2010). Adoption of technology for increased agricultural productivity is made possible when there is a strong partnership between national policymakers, community leaders, donors, agricultural researchers, farmers' organisation and other agricultural stakeholders (Muzari *et al.* 2012).

The inputs in smallholder farming are insufficient when a farmer stands alone, but when working as a group or cooperative, small producers can obtain agricultural inputs and other necessities at better prices (FAO, 2012a). In sub-Saharan Africa use of fertilizers, pesticides and improved seeds is very low due to their high price and lack of availability (Muzari *et al.* 2012). A study conducted in Uganda by Kaizzi *et al.* (2012) on maize response to fertilizer and nitrate use concluded that low maize production is due to low soil fertility and low fertilizer use. Gathiaka (2012) argues that smallholders' farmers can profit by using inputs that are known to elevate output such as developed land husbandry practices and fertilizers. Climate changes and natural problems such as drought, flooding, outbreak of pest and diseases can also be devastating for small-scale farmers unable to adopt irrigation systems (Masozera & Andrew, 2010).

2.4.3 Credit, market and policies

Small-scale farmers do not have easy access to financial credit for buying inputs to increase their productivity (Muiruri *et al.* 2012). To improve access to credit, government and financial organizations need to support rural finance providers, and agricultural cooperatives need to develop a bank savings culture (Sebhatu, 2011). A study conducted in South Africa by Chisasa and Makina (2012) highlights the problem of credit for smallholders in developing countries. In South Africa, very little credit is offered to smallholders as compared to commercial farmers because smallholder farmers have low viability and lack collateral. Dzadze *et al.* (2012) investigated factors that limit or increase smallholder farmers' access to formal credit in Abura Asebu Kwamankese, Ghana, and found that level of education, smallholder saving accounts, and extension contacts significantly influence farmers' access to credit. Farm sizes, value of non-fixed assets, infrastructure quality in the area and literacy status are further variables in determining access to credit for smallholders (Amjad & Hasnu, 2007). Worldwide, microcredit has been identified as an influential anti-poverty tool, particularly for rural smallholder farmers (Anyiro & Oriaku, 2011). A study conducted in Pakistan by Saleem and Jan (2011) showed that bank credit helped farmers to buy seed, fertilizer and pesticides that are very important for positive agricultural productivity.

Lack of market facilities and of reliable, high-value markets and infrastructure are further constraints on smallholder development (Poulton *et al.* 2006). A study conducted in Arumeru District, Tanzania by Kulindwa (2013) suggested that the constraints on household participation in the market are inadequate farm size with corresponding small crop yields, distance between market and household, and age of the household head. Enhanced technology, market infrastructure, boosted social capital, and smallholder-oriented institutions can encourage small-scale farmers to participate in formal markets, which are important to improve smallholders' livelihoods (Jari & Fraser, 2009). According to Oruonye and Musa (2012), small-scale farmers do not participate in the formal market because the low prices they get for their farm products are not commensurate with the effort they must expend in production. A study conducted in Kenya by Omiti *et al.* (2009) showed that smallholder farmers' decision to supply the market is dependent on distance between farm and the point of sale, market information, and market price. Hence the need for good policies to enlarge financial access for small-scale farmers (Djurfedt *et al.* 2011). A study conducted in Rwanda and Kenya by Larsen *et al.* (2009) draws attention to the government-supported Savings and

Credit Cooperative Organization (SACCO) that provides loans for small-scale enterprise, raising their production and marketing capacity. Yasmeen *et al.* (2011) conclude that establishing and implementing good government policies is the key to infrastructure support for production, transport, assets and improved education for smallholder farmers and their children.

2.5 Relationship between small scale farming and food security

Worldwide, approximately 400 million farms smaller than 2ha are cultivated by 0.5 billion farmers. Some 1.5 billion people are sustained by these small-scale farms, which, in developing countries, supply 80 per cent of the food supply (FAO, 2011). In sub-Saharan Africa the majority of food producers are small-scale farmers (Yengoh, 2012). In Rwanda, more than 60 per cent of households cultivate farms smaller than 0.7ha, around half of farming households cultivate farms smaller than 0.5 ha, and more than a quarter cultivate less than 0.2 ha (IFAD, 2011a). To counteract this problem, Rwanda is using agricultural cooperatives as a means to increase production by agricultural smallholders (RCA, 2011).

Apart from the food they grow for themselves, smallholders and farm workers nearly always buy more food products than they sell, since they have insufficient production capacity to feed themselves throughout the year, which exposes this population to poverty and hunger (IFAD, 2011b). According to Lipton (2006), the majority of poor people are in developing countries where more than two-thirds of the workforce obtains their sole income from agriculture. In Rwanda 86 per cent of Rwandans still rely on agriculture for a living. Even though the big part of population is involved in agriculture, they do not have enough land for farming and this is a major source of poverty (DFID, 2012). In these circumstances, agriculture cooperatives significantly help small farmers and other producers to increase food production, create jobs and improve their livelihoods (FAO, 2012a)

Lipton (2006) has argued that good implementation of policies and agricultural developments for smallholders are the key to poverty reduction in developing countries. The World Bank (2010) defines poverty as living on less than US\$1.25 a day. According to the Rwandan government definition of poverty,

At an individual level, a man or woman is considered poor if they: are confronted by a complex of inter-linked problems and cannot resolve them, do not have enough land, income or other resources to satisfy their basic needs and as a result live in precarious conditions;

basic needs include food, clothing, medical costs, children's schooling etc. and are unable to look after themselves. Their household has a total level of expenditure of less than 64,000 Rwf per equivalent adult in 2000 prices, or if their food expenditures fall below 45,000 Rwf per equivalent adult per annum. At the household level, households headed by widows, children, the elderly and the handicapped are deemed likely to be poor (RoR, 2002).

Supportive promotion of small-scale farming in developing countries in terms of labour, technologies and financial issues is a means of mass poverty reduction in view of the high percentage of population involved in smallholder farming (Lipton, 2006). A study conducted in East Africa by Salami *et al.* (2010) found that smallholder farming contributes to about 75 per cent of agricultural production and more than 75 per cent of employment, but nationally faces challenges of weak institutions, restricted access to market and access to credit. All of these factors hamper productivity improvements such as training intended to develop skills and encourage technology use and innovation. The study by Yengoh (2012) in Cameroon found that women were the predominant food producers among small-scale farmers. Investment in agricultural extension contributes to increased food-crop yield and food security, and spreads the use of technologies like improved seed, fertilizer and residue management. Failure to provide financial assistance hinders the propagation of these technologies, leaving smallholder farming communities in continued food insecurity and poverty.

The FAO (2012b) notes that by 2050 worldwide food demand is expected to increase by 60 per cent, with smallholders playing an important role in providing for food demand. In the Green revolution in Asia, smallholders increased productivity and produced enough staple food to significantly lower food prices to the consumers and improve food security. In sub-Saharan Africa, the agriculture sector is a crucial economic driver, contributing 75 per cent of workforce employment in low income countries and approximately 30 per cent of GDP (WB, 2007). In further support of the sector, agricultural cooperatives not only facilitate access to credit (Okon *et al.* 2012) but can also be a channel of access for smallholders to inputs for production increase, training and getting their product to market (Ortmann & King, 2007).

2.6 Benefits of agricultural cooperatives to their members

Agricultural cooperatives are established in order to help farmers in various social and economic household circumstances in accordance with cooperative principles whereby

cooperatives are user-owned and user-controlled, and the benefits gained by the cooperative are equitably shared by the cooperative members (Özdemir, 2005). Through agricultural cooperatives, farmers are able to gain many benefits, as in the following examples.

2.6.1 Increasing members' income and food security

Agriculture has been identified as an engine for rural economic growth whereby poverty is reduced and the household food availability is increased (Abdu-Raheem & Worth, 2011). The development of agriculture offers a diversity of food at household level and alleviates hunger and malnutrition by increasing household food consumption and creating economic opportunities for vulnerable people, especially those engaged in subsistence farming (Hendriks & Lyne, 2009). A study conducted in Swaziland by Mavimbela, *et al.* (2010) indicated that agricultural cooperatives are an important tool for boosting household income as the members normally work together towards a specific goal of getting profit. Also, the objectives of a cooperative are to provide goods and services to its members whereby they increase income and savings for social and economic benefits of cooperative members. Profit or surplus of a cooperative is the difference between the total incomes of the cooperative and the total cooperative expenditures at a given period of time (e.g., one year), and the surplus is equitably shared by the cooperative members (Ruccio, 2011).

Research conducted by Karlı *et al.* (2006) in the South-eastern Anatolia Region of Turkey found that small farmers choose to join agricultural cooperatives mainly for the benefit of cash at hand, though not ignoring the other benefits that support agricultural production such as inputs subsidies and other services provided by the cooperatives. Thomas and Hangula (2011) suggest however that agricultural cooperatives may fail and not provide income to the members through lack financial irregularities, poor management, conflicts among members and disloyalty of members.

2.6.2 Access to technical assistance / provision of services and training

Although there may be a small profit margin for the cooperative on each of its operations, the main objective of a cooperative is to provide basic needs to the members. Zimbelman (2007) explains that this is done by providing services that are not available to the members or by improving those already existing. Agricultural cooperatives, for instance, provide a variety of important services needed by the members to boost their agricultural output. Jimoh (2012) stresses that a cooperative must not only supply its members with the requisite inputs for

agricultural production (seeds, fertilizer, pesticides, herbicides, fuel, machinery services, etc.) but also it provides technical assistance by teaching its members how to use these inputs. In this way the cooperative members get agricultural inputs and technical know-how at low prices with the prospect of high yield and also profit after harvesting. A study conducted in Mexico by Taylor and Yunez-Naude (2000) found that agricultural productivity is significantly increased when farmers are given training in more appropriate use of agricultural inputs and also in post-harvest value-added operations such as processing, packaging, distribution and marketing of cooperative farm products. A very important cooperative objective is promoting the education of its members, and appropriate training enables cooperative to perform all the activities involved in the value-added chain.

2.6.3 Improved market competition and expanded market opportunities

According to Pica-Ciammarra *et al.* (2011), about 75 percent of the world population, equivalent to 1.2billion, are extremely poor and live in rural areas where they are dependent on agriculture. Agricultural development is thus a crucial factor in seeking to pull people out of poverty. In other words, households need to be assisted in their farming and their livestock keeping because boosting these two crucial sources of household income is vital in poverty reduction and livelihoods support (WB, 2008). A study by Gani and Adeoti (2011) on rural poverty in relation market participation and among farmers in the northern part of Tabara State, Nigeria reported that improvement of rural agriculture implies an increase of agricultural inputs, which is not achievable unless markets for farmers' produce are also supported, since agricultural production needs an efficient and responsive market system to receive its output. Marketing capacity is thus a crucial element in the development of rural farmers as it affects both farm investment and production decisions.

Small-scale farmers, especially in rural areas, encounter numerous challenges when they try to enter the market (Robbins and Ferris, 2003). A study conducted in India by Hagargi and Kumar (2011) showed that rural markets facilitate national development by boosting the economy of rural areas where a high proportion of the population are involved in agrarian activities. Challenges that preclude access to market by rural people include poor infrastructure, costly and inadequate transport, and lack of contract farming. These logistical weaknesses in the distribution of products cannot be easily be tackled by an individual (Shiferaw & Teklewold, 2007).

Cooperatives can overcome these challenges; Olson (2009) argues that farmers' cooperatives can tackle marketing barriers by reinforcing market access, negotiating power and political representation. Equally important, collective cooperative action matches the needs of emerging niche markets. A study by Adebayo *et al.* (2010) in Rwanda concluded that in developing countries where smallholders face the problem of market access and need socioeconomic development, organizing people into cooperatives is a crucial tool in rural development and rural poverty reduction.

2.6.4 Access to bank credit

Small-scale farmers serve a vital role in all rural areas. A study conducted in Ghana by Abunyuwah and Blay (2013) observed that the smallholder farmers encounter numerous problems that hamper their agricultural production and keep them in a state of poverty. The researchers noted that the fundamental predicament of smallholders is limited access to agricultural finance. This serious limitation also inhibits agribusiness investment in rural communities, but agricultural cooperatives can be formed where smallholder farmers have the necessary willingness and initiative. These cooperatives have the goal of improving farmers' incomes and livelihoods in seeking to attain common economic, social and cultural needs (Novkovic & Power, 2005).

To achieve these objectives, cooperatives need to target certain key investments. A study conducted by Dung (2011) in Bac Ninh province of Vietnam found that agricultural cooperatives provide a high number of services to farm households, with the focus on seed supply, crop varieties, supply services, irrigation, fertilizer and pesticides, field protection, extension services and other farm activities. Many of these activities need financial support that can be raised either from contributions by cooperative members, surplus retained, or credits provided by the banks. Similarly, a study by Gana *et al.* (2009) in Nigeria recommended that small-scale farmers looking for a bank loan should be encouraged to form a cooperative. Formation of cooperative will facilitate access to credit and applications for loans, with the double advantage that loans are made to a group of people which will develop their social and economic capacity, and administrative cost is reduced for banks making such loans.

Many difficulties nonetheless remain that may cause cooperatives to fail, including poor management of credit, lack of capital, and problems with portfolio and property rights. Fear

of failure because of problems such as these sometimes deter people from entering a cooperative (Fulton & Hueth, 2009).

2.6.5 Democratic support and social cohesion

For peaceful coexistence people need to have an equal say in the decisions that affect their lives (Christiano, 2003). On the whole, cooperatives are reported to be sources of democracy, with a primary cooperative principle dictating that they are democratic organizations controlled by their members. Eligible cooperative members thus have a democratic right to participate equally in voting for their leaders, either directly or through elected representatives (Mendoza & Castillo, 2006). In this way cooperatives foster social, economic and cultural conditions which favour free and equal political self-determination (Dobrohoczki, 2006). Majee and Hoyt (2011) note that cooperatives support member involvement in organizational control, negotiation and influence, and in determining accountability not only to the cooperative organisation but also to the fellow-members whose lives it affects.

According to the FAO (2012a), cooperatives work towards specific goals that not only improve household food availability but also nurture social, economic and cultural needs. And while Nilsson *et al.* (2012) suggest that some people choose not to belong to a cooperative because they are not satisfied with the level of social networking it provides and they see more benefit in working as individuals, Emanu (2009) notes that sociability and unity among cooperative members is also sustained by group activities such as assistance in social activities such as wedding, religious activities and funerals. A study by Sentama (2009) entitled “Peace building in Post-Genocide Rwanda” concluded that cooperatives in Rwanda are free from discriminatory characteristics. Some cooperatives include both genocide survivors, and former genocide perpetrators and their relatives, yet through joint pursuit of socioeconomic development objectives, negative or dehumanizing attitudes were overcome and positive attitudes were nurtured instead. Thus cooperatives can overcome societal conflicts by improving and restoring the relationship among cooperatives members.

2.7 Approaches for measuring food security

As food security is a multidisciplinary discipline, it has got many different methods and indicators of measurement. There is no single indicator combining all food security aspects

and be used to measure food insecurity (Maxwell *et al.* 2013). For instance, hunger and poverty interweave and similarly present about the same indicators in their measurement. As both of them are characterised by the same indicators of basic needs shortages such as food, clothing, shelter, and safe drinking water, so the approach to measure them are almost similar (Tina, 2008).

For the poverty and food security, it was shown that household farmers with small landholdings have high risk of suffering from food insecurity and poverty due to low income where both income and consumption are the measures of poverty (Maharjan & Joshi, 2009). According to Millennium Development Goals (MDGs), poverty measure at household and individual level is based on household income and expenditures. People who do not have sustainable income and live on less than 1.25 \$ a day is considered as food insecure and living in extremely poverty and hunger (Kozak *et al.* 2012).

For instance, in Household Expenditure Survey Method (HESM), people are interviewed at household level and provide information on money spent on food and other expenditures within a week or month. A researcher would be able to know the costs of household on foods and quantity of food bought and consumed within a household. With reference of food and their calories to household dietary diversity (Swindale & Bilinsky, 2006), researcher will be able to estimate the number of calories consumed by household members per day and determine the living costs (Bashir & Schilizzi, 2012). Nutritionally, the shortfall or increase of calorie intake is referred to 2100 Kcal intake per person per day (FAO & WFP, 2009).

There are many other methods used to measure food security, either on national, household or individual level. These methods include dietary intake assessment, anthropometry, rapid rural appraisal, household food insecurity access scale, etc. Sometimes two or three methods can be combined for the purpose of efficiency (Bashir & Schilizzi, 2012).

To sum up, the literature review chapter has discussed the origin of cooperatives, noting both their long history and also their more recent tradition founded on the guiding cooperatives principles laid down in 1844 by the Rochdale Society of Equitable Pioneers in Britain. In Africa, cooperatives also are old as human society, but have been more particularly shaped during the colonial period. As elsewhere in Africa, the colonizer in Rwanda emphasised agricultural cooperatives targeting exportation crops like coffee and tea. Current reform of national policy in Rwanda on promotion of cooperatives was established by law in 2008.

Among the types of cooperatives, primary cooperatives have been emphasized – particularly agricultural cooperatives – along with challenges that include lack of capital, poor management and leadership and negligible equity participation. Agricultural production cooperatives in all developing countries face many problems in relation to land and labour, agricultural inputs and education, as well as finance, market and policies. However, agricultural cooperative members obtain many benefits. First, they are able to get access to the bank credit which increases their agricultural production and improves their income. Second, cooperative members have chance to access technical assistance and educational training, improve market competition and expand their market opportunities. Third, cooperatives promote democracy which facilitates the cooperative members' participation in voting for their leaders that they influence and hold accountable, thus strengthening social networking and cohesion.

To analyze smallholder food security, many approaches have been developed and due to the fact that hunger and poverty intertwine together production, income and consumption of a smallholder is a good indicator. Worldwide, a person who do not consume at least 2100Kcal per day is considered to be undernourished and according to Millennium Development Goals if someone is living on less than 1.25 \$ a day, s/he is food insecure and lives under poverty line. Therefore the progress of smallholder farmer cooperative may be the source of production and income that in return nourishes the cooperative members.

Chapter Three

Requisites for agricultural cooperative effectiveness

A cooperative is a type of business corporation with unique principles of “user ownership, user control and user benefit” (Ortmann & King, 2007). In agriculture, cooperatives are regarded as a way to support farmers, particularly subsistence producers, in achieving well-being for the members as well as societal goals (Allahdadi, 2011). An agricultural cooperative engages with a combination of inputs and changes them into outputs. The inputs are acquired from within the society or the surrounding environment of the community where members residing. The outputs are distributed and sold in the community in order to obtain other resources which are reinvested to continue the cycle (Dlamini, 2010).

Collective farming provides benefits to subsistence farmers. The cooperative approach can encourage more efficient use of resources through high participation of farmers, proper delivery of inputs, better adoption and use of technologies, improved market access of farm products and other support services (Wanjari, 2011). A number of different indicators can be used to assess cooperative effectiveness but the choice of indicators depends what they are intended to measure and the nature of the particular cooperative organization (Dlamini, 2010).

3.1 Conceptual framework for measuring the effectiveness of primary agricultural cooperative.

Issues of particular significance that emerge from the literature review in chapter two are benefits of cooperative members, challenges of production and the relationship between subsistence farming and food security. In focussing on the importance of agricultural cooperatives in household food production, a conceptual framework was developed (see Figure 3.1) which takes into account key factors determining the success of an agricultural cooperative. For assessing the effectiveness of a particular group, cooperative goals are used as standards/measures for evaluation of cooperative effectiveness.

3.1.1 Key fundamentals for success of an agricultural cooperative

One major factor for success of any organization is finance. An agricultural cooperative also needs access to finance for its effective operations. The availability of finance means of access to it, and its distribution and use is crucial for cooperative growth

(Onafowokan, 2012). For that reason, it is a key starting point in the conceptual framework used to analyze cooperative effectiveness. Exploring the ability of cooperative to mobilize resources and use them appropriately gives an initial overview of its ability to acquire materials and financial used in day-to-day operations. Tchami (2007) argues that the success of a cooperative as a vehicle for rural development and increase of agricultural production depends on support from government and donors through provision of credits, farm inputs and crops.

The next issue to determine is the nature of the cooperative operations being undertaken to improve production. Production grow this crucially dependent on provision by the cooperative of agricultural inputs like fertilizer, improved seed, and other mechanisms intended to prevent crop diseases or predators (Ortmann, 2007). A further important indicator for effective production is the training members receive in the use of farming techniques and technologies, tools for cultivation, and good agricultural practices (Mushobozi & Santacoloma, 2010). Equally important, a cooperative needs a well-determined weekly schedule for work processes that optimizes member participation for economies of scale and cuts out free-riding members. Products then need to be sold for cooperative income, and this is a point at which small, struggling farmers unable to compete on the markets and hampered by market fluctuation often decide to join a cooperative for added stability and security in the distribution of their produce. Efficient cooperative marketing gives them access to market, transport, increase bargaining power and the potential of countervail force to compete with big traders in the market place (Zarafshani *et al.* 2010). Rural cooperatives still face problems of low price due to the seasonal nature of production, but they are less affected than their counterparts outside the cooperative.

A third determinant of an agricultural cooperative's effectiveness is leadership and decision-making by and on behalf of its members. Chen *et al.* (2006) argue that a cooperative as an institution should set a clear vision and establish a legal framework. Management team members should value one another, create relationships among cooperative members and facilitate proper coordination through effective communication. In addition, establishing mechanism for solving cooperative problems and setting disciplinary system improves membership trust and commitment that are crucial for maintaining effective organization in collective actions (Mansfield, 2005). It is important therefore that all of these aspects are handled transparently and for the promotion of cooperative interests.

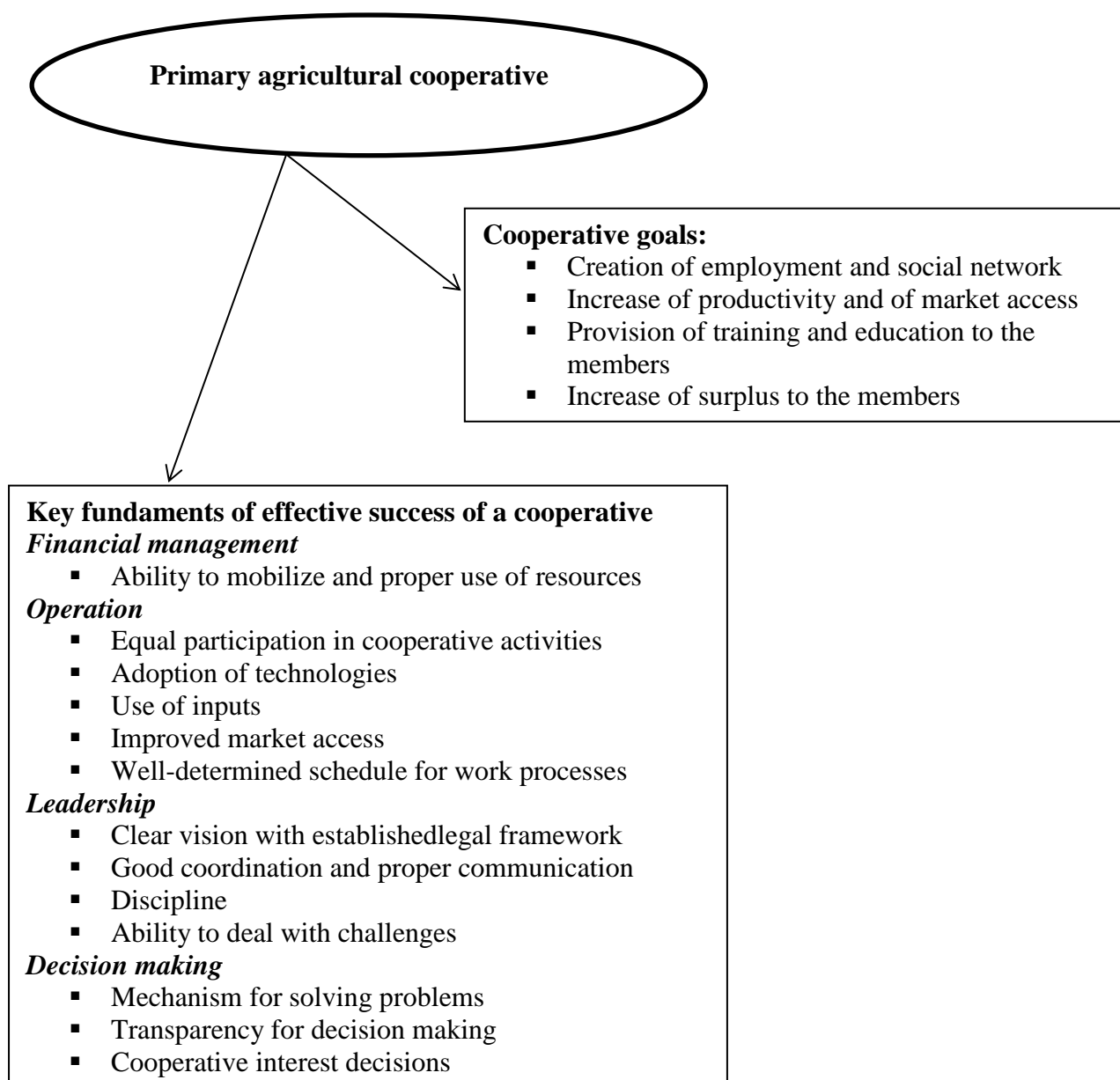


Figure 3-1 Conceptual framework for measuring the effectiveness of a primary agricultural cooperative (*adapted from Dlamini, 2010*)

3.1.2 Setting and attaining cooperative objectives

Each cooperative has its own objectives. The evaluation of a cooperative outputs is based on attainment of its goal. Figure 3.1 presents a conceptual framework in which key elements of effective success of a cooperative can be used to measure achievement of its objectives. The framework is used in this study to measure whether selected pineapples, maize and peas cooperatives in Mwendo Sector meet their key objectives based on the fundamentals mentioned in the framework.

Chapter Four

Description of the study area

Agricultural cooperatives in Mwendo Sector field have not previously been researched extensively. The author found few documented studies on cooperatives in this area, yet cooperatives are important government strategies in development. This study focuses on assessing the role of agricultural cooperatives in household food security in Mwendo sector. Three crops were selected for this study: pineapples, peas and maize. Three cooperatives involved in the farming of these crops were chosen.

4.1 Geographical location of the study area

Mwendo Sector is one of nine local municipalities of the Ruhango district. It is located in the western part of the Southern province of Rwanda. As shown in the figure 4.1 below, Mwendo Sector is a mainly rural area where the local municipality office does not have electricity and the majority of the population relies on subsistence farming. The extent of household land for cultivation varies from 0.26 to 0.45 hectares and 81 per cent of the land is protected from soil erosion (NISR, 2011).

Farmers in the locality farm at subsistence level. The main crops grown are cassava, maize, beans, pineapples, rice, tomatoes, cabbages, sweet potatoes and yams. Mwendo Sector covers an area of 5,555 km² and has an estimated population of 23,213 with 12,023 females and 11,190 males. Sector (local municipality) estimates give an average population density of 417/km². There are 5,036 households in the area, with male headed-households outnumbering female-headed-households in an estimated ratio of 3278:125. Mwendo sector is counted among the poorest sectors in the district (RD, 2010).



Figure 4-1 Map of Mwendo Local Municipality indicating the study area

Source: Rwanda Natural Resources Authority: (Land and Mapping Department, 2013).

Economically, Mwendo local municipality (sector) does not differ from the district as a whole. The overall employment rate in the district is 88 per cent for residents aged 16 years and above. Agriculture is the main industry, comprising 83.2 per cent in the sector, while utilities and financial services comprise 3 per cent. Other services like trading comprise 5 per cent with manufacturing and government services and others totalling less than 2 per cent (NISR, 2012).

Agriculture is the main driver of household income at 55 per cent; wage income and rents and private transfer accounts represent 12 per cent and 9 per cent respectively. Government

services and private business show the smallest contribution to household income at only 1 per cent. Poverty has been estimated to affect 60 per cent of the population in Ruhango district with the percentages of extreme poor and poor groups estimated at 32.2 per cent and 28.2 per cent respectively (NISR, 2012).

4.2 Pineapples Growers' Cooperative of Gafunzo (COCUANGA)

There are numerous cooperatives growing pineapples in Ruhango district and in Mwendo sector in particular. COCUANGA (Pineapples Growers' Cooperative of Gafunzo [Cooperative des Cultivateurs d'Ananas de Gafunzo] were randomly chosen as samples for the study.

COCUANGA cooperative falls under Gafunzo cell in Mwendo sector; it produces pineapple on 2.5 ha of rented land which has been terraced for anti-erosion purposes. The cooperative now registered in Mwendo Sector was effectively founded in 2010 by 42 members, mostly Mwendo sector youth seeking for employment and income. Interestingly, the number of female members equals the number of males and five cooperative members have attended tertiary education.

The cooperative has a bank account with Mwendo Savings and Credit Cooperative Organization (SACCO), although collaboration of this microfinance institution with the cooperative in terms of sourcing credits or loan is, unfortunately, weak, and the cooperative does not currently receive any bank credit. In this research, all cooperative members responded to the questionnaires. Figure 4.2 indicates field visits during the research where members of cooperative were performing their activities.



Figure 4-2Field trip research during COCUANGA cooperative activities, 2013

4.3 Legumes Growers' Cooperative (Cooperative des Agriculteurs des Legumes: COPALE)

COPALE cooperative is based in Mwendo Sector, Kamujisho cell, where it carries out all its agricultural activities. It was started in 2010 by household members looking for a way of augmenting vegetable production and was streamlined in the Rwandan government's vision of developing agricultural cooperatives. The main vegetable crops grown by the cooperative are carrots, cabbages and peas, in addition to some crops of maize and cassava.

Equally important, the cooperative is registered and has 52 members, of whom 50 were randomly chosen for answering the questionnaires. The largest number of participants was in age group 50–60 years. In this cooperative the number of women is greater than the number of men. The land being cultivated by the cooperative is 3 ha in extent.

High population density means that the cooperative unfortunately has to rent land in order to carry out its activities. Figure 4.3 shows a COPALE pea field and an illustration of a face-to-face interview conducted by the researcher after a cooperative meeting.



Figure 4-3Face to face interview in COPALE cooperative, 2013

4.4 Maize Growers' Cooperative (Cooperative des Agriculteurs de Maïs:COAGRIMA)

COAGRIMA cooperative is located in Mutara cell, Mwendo sector. This cooperative is primarily involved in farming maize, on approximately 6 ha which is rental land due to the overpopulation of the locality. The cooperative was registered in 2010 but started in 2008 with the objectives being income, jobs and skills development through training. In this cooperative all members were married, the ratio of men to women was 58:42, 60 per cent of respondents were over 50 of age, and two were in the age group 70–80 years.



Figure 4-4Field trip research during cooperative maize harvest, 2013

Age levels also meant that education levels of cooperative members was lower than for the previously mentioned cooperatives. Of 50 respondents asked, 22 had not completed primary education and 7 had not been to school. This was basically linked to the fact that many participants were born around the period of Rwandan independence (1962) when education was not well developed. Figure 4.4 indicates harvesting activities at the time of the field visit during the research.

4.5 Sample characteristics of respondents

This study was carried out with a sample of 150 participants. In addition, there was a focus of three cooperatives with three crops *viz.* pineapple, peas and maize. The distribution of participants according to the crop and cooperative are as follows: 50 participants were from COCUANGA, growing pineapples, 50 participants were from COPALE, growing peas, and 50 participants were from COAGRIMA, growing maize. All participants were requested to complete a questionnaire in order to get information about cooperative organization, factors enhancing production and the benefits for cooperative members. Furthermore, the gender of participants was recorded for the purpose of statistical analysis. Table 4.1 presents the gender of respondents from cooperatives farming pineapples, peas and maize. It shows the frequencies and percentage of respondents.

Table 4-1 Gender of respondents in different cooperatives (n=150)

Gender	Frequency	Percentage
Female	73	48.7
Male	77	51.3
Total	150	100.0

There was a dominance of men in the study group, which matched the overall male to female ratio of 51:49 that was found in the cooperatives. This ratio is close to findings on East Africa cooperatives by Majurin (2012) in which women's participation varied from 30 to 42 per cent in agricultural cooperatives in Kenya, Tanzania and Uganda, where women tend to be marginalized, especially in cash crops like coffee, cotton and tobacco. Although there was increased membership of women in subsectors such as spices, fruits, cereals and dairy.

As shown in Table 4.2 the 50–60 age groups predominated in the study, representing 33.3 per cent of all respondents. The older respondents came mainly from COAGRIMA cooperative, growing maize and COPALE cooperative, growing vegetables.

Table 4-2 Age of cooperative members

Age of respondents	COCUANGA n=50	COPALE n=50	COAGRIMA n=50	Frequency	Percentage
20–30	27	2	2	31	20.7
31–40	15	9	7	31	20.7
41–50	3	8	11	22	14.7
51–60	4	28	18	50	33.3
61–70	1	3	10	14	9.3
71 and above			2	2	1.3
Total	50	50	50	150	100

The youth were found not to be participating in agricultural activities for reasons such as lack of commitment, not possessing land, and lacking support in terms of logistics (Daudu *et al.* 2009). Two cooperatives (COAGRIMA and COPALE) showed a good number of adults members; they also had a high percentage of married participants. All COAGRIMA cooperative members were married, for instance, and only two persons in COPALE were single.

COCUANGA cooperative, on the other hand, mainly has young members, with 60 per cent still single. These young people reported that they joined the cooperative because they would

like to increase production and income and benefit from training through government and NGO support. They were also looking for employment to improve their social participation in the community. Abdullah and Sulaiman (2013) concluded that attitude; acceptance and knowledge are not the only factors that influence youth to become involved in agricultural entrepreneurship and those other factors like family support, government support and promotion through festivals or other social celebrations also motivate youth to participate in agricultural activities.

With regard to education, a noticeable difference was observed among the cooperative members selected for this study. A sizeable percentage of respondents (58%, or 78 out of 150 participants) had completed primary school. Tertiary education, on the other hand, was very low with only five individuals having attended higher learning institutions and all five coming from one cooperative (COCUANGA). Results showed that 3.3 per cent of all respondents had never received formal education; COAGRIMA was the cooperative with the highest number of members (seven, in this case) who had never been to school. Normally, low education level of cooperative members impedes upturn of food production and social change. Burchi (2006) emphasizes that basic education and higher education are the main factors that allow people to live a decent life where they escape the hunger trap. This is because being educated develops the thinking capacity of individuals or of a community to enable them to increase agricultural productivity, diversify activities that secure their assets and access information about health and sanitation. All of these are essential components to ensure food security in long run.

Unfortunately, the second largest number of participants (26% of the total) was individuals who did not complete their primary education. Figure 4.5 illustrates how the level of education is distributed among all respondents participating in the study.

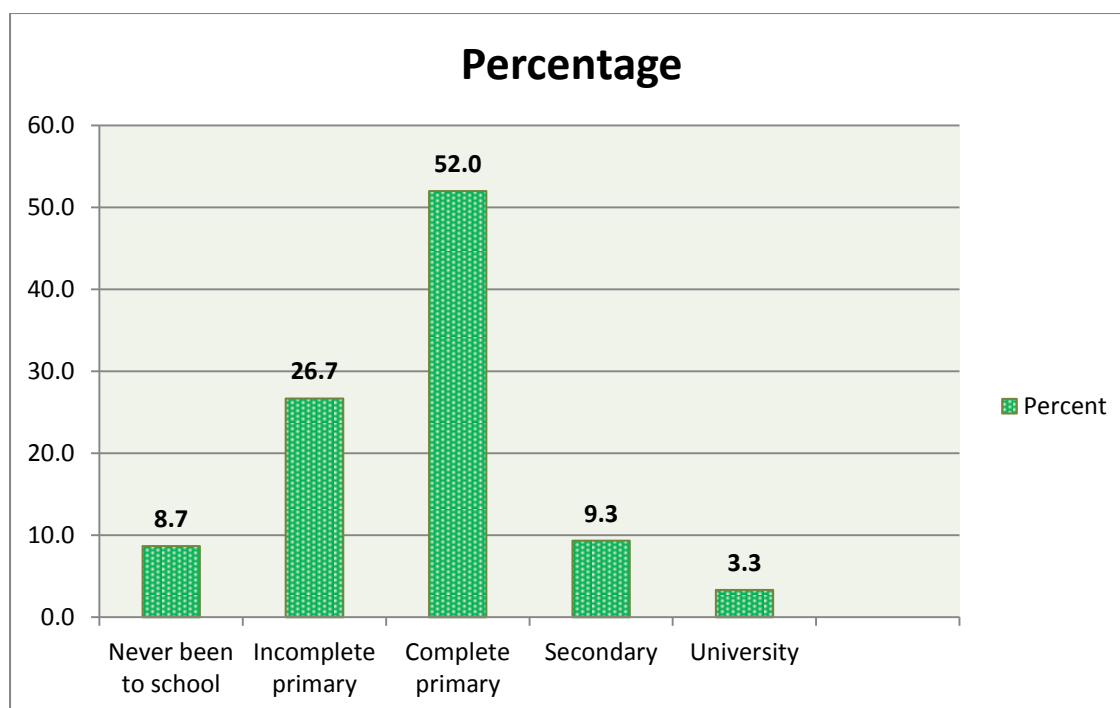


Figure 4-5 Education level of all respondents

A slightly a lower figure of members in all cooperatives had been in secondary education, and most of the educated members were young. After the 1994 genocide education in Rwanda was drastically improved; literacy rates for women and men aged 15–24years were 72.5 per cent in 1990 and 83.7 per cent in 2010 (NISR, 2012).

Chapter Five

Research methodology

5.1 Introduction

This study explores agricultural cooperatives by evaluating the role of pineapple cooperatives in the development of household food security in Mwendo sector, Ruhango District, Rwanda. This chapter details the research design and methodology used during data collection and data analysis. This inquiry was primarily designed to identify the organizational structure used by Rwandan cooperatives (in Mwendo Sector in particular) to achieve their goals, factors influencing agricultural production, the benefits of being or not being a cooperative member, and the contribution to household food security of income from the cooperative.

5.2. Sample selection

The total number of cooperatives involved in subsistence agriculture in Mwendo sector was 23 (government officer). Three cooperatives, producing pineapples, cowpeas and maize, were randomly selected and 50 respondents in each cooperative were identified and questioned. The criteria used to select cooperatives were focused on three important things:

- willingness of members to participate in this research
- active engagement in smallholder cooperative farming activities
- accessibility of the locality (taking account of lack of infrastructure and poor communications)

For the purposes of comparison it was important to scrutinize more than just a single cooperative growing a single crop.

Simple random sampling was used to select the cooperatives. Fox and Bayat (2007) explain that simple random sampling is a technique used by researchers to select samples in a population for calculating parameters such as averages, variances and proportions. The technique provides valid estimates of population parameters permitting valid deductions about the whole population.

This research also included non-members of cooperatives with the purpose of obtaining information about the reasons for non-participation in the cooperatives and comparing their activities, opinions and perceptions with those of cooperative members. From this

information conclusions could be drawn regarding the importance of being involved or not being involved in agricultural cooperative activities. The complete sample size selection embraced both subsistence farming cooperative members and individuals not belonging to any cooperatives. All participants, cooperative members and non-members of cooperatives, were randomly selected according to their availability on the scheduled date and willingness to take part in this research.

5.3 Data collection method and tools

In his investigation of agricultural cooperatives the researcher and an extension officer paid an informal visit to the cooperatives while they were engaged in their day-to-day activities. According to Bossman and Rallis (2012), multiple methods of gathering data, such as the inclusion of field visits, are helpful and support in-depth interviews or questionnaire data collection. This is because they enable the researcher to observe and understand the context of the study and see patterns people may not want to talk about.

The field visit during this investigation had a specific aim, which was to introduce the topic and obtain the cooperative members' consent. During the informal visit information on the current situation was collected through situation analysis. An agricultural extension officer accompanied the researcher on the first visit to give support and identify the research area.

To improve the reliability of information and results, the data collection methods employed in the research process included research questionnaires, focus groups and key-informant interviews.

5.3.1 Questionnaire

The questionnaire was carefully designed and consisted of a series of questions concerning research issues to which respondents gave answers. For collection of data the questionnaire contained both closed-ended and open-ended questions (Kumar, 2005). The respondents included agricultural cooperatives members and individual subsistence farmers. The questionnaire was administered during face-to-face interviews in an attempt to avoid dominance of certain individuals in the cooperative and to give an opportunity to the individuals to express themselves by providing the truthful responses without being intimidated by other cooperative members. Face-to-face interviews were helpful due to the fact that some respondents were illiterate. When a respondent could not fully answer the

question s/he was probed further to elicit more complete data, and using this method prevented the respondent from jumping or flipping through the questionnaire to check what was coming next (Bernard, 2000).

The main objective of this survey was to obtain more detailed information to address research objectives from both individual cooperative members and non-cooperative members. The questionnaire was composed in English but translated into Kinyarwanda which is the local language of the area. The sampling plan for the inquiry was targeted to cover the majority of all the selected agricultural cooperatives' members, plus the leader of Rwanda Cooperative Agency, non-governmental organizations assisting in agricultural cooperatives, and some individual subsistence farmers.

5.3.2 Focus groups discussions

A small group that included members of both struggling and more successful, established agricultural cooperatives, mixed with some individual subsistence farmers, was randomly chosen for the purpose of discussions in order to collect additional data. Morgan (2007) explains that focus groups provide additional information to supplement data to that has already been collected through other qualitative or quantitative methods such as individual interviews, and the goal of this combination of methods is to contribute something unique to the researcher's understanding about the study.

In this study the focus group was composed of 10 individuals, with the following make-up: one female involved in agricultural activities, any two males, three people from successful, well-established cooperatives and four people emanating from struggling cooperatives.

Optimistically, the research allowed focus group discussions to provide full information without any pressure or intimidation. Desai and Potter (2006) poignantly clarified that focus groups play an important role in offering effective information without pressure and are a quick way of engaging with community groups and collecting consistent data among the people whose lives are influenced by the same issues.

The focus group discussions were therefore essentially directed towards the benefits of agricultural cooperatives to the lives of their members: Q1. What benefits do you obtain from being involved in the cooperative? Q2. How does your household use income from the

cooperative? Q3. How would you cope without the cooperative income? Q4. What kind of training do you need/expect in the cooperative to increase food production?

5.3.3 Key-informant interviews

This method of supportive data collection was undertaken using qualitative in in-depth interviews with three key informants: a government official responsible for cooperatives in the Rwanda Cooperatives Agency (RCA), an agriculture officer in Food for the Hungry International (an NGO working with agricultural cooperatives) and an agricultural extension officer in charge of Mwendo sector. They were face-to-face interviews and the questions were structured in advance, in accordance with Olsen's (2012) explanation that an interview for collecting qualitative data is an interaction that involves at least two people talking about the subject.

According to their particular knowledge and understanding of the communities, key informants supplied information on:

- how they support cooperatives in terms of training and inputs, and how often they visit them
- what changes they see and what constraints are they faced with in doing extension work
- what support they need to improve their work

5.4 Data analysis

Qualitative and quantitative methods were used to analyze and interpret the data collected through questionnaires, focus groups and key-informant interviews.

Both qualitative and quantitative data were subjected to standard analysis using the statistical package for social science (SPSS, Version 19). Data analyses included descriptive statistics (percentage and frequencies), cross-tabulations and chi-square tests. Summarized data were used to determine the relationship between independent and dependent variables and to establish key comparisons. Table 5.1 presents sub-problems, data collection tools used in the research, data collected and the method of analysis where different methods were used to determine the explanations of research objectives.

Table 5-1 Data collection and analysis plan for each sub-problem

Sub-problem	Data collection tool	Data collected	Way of analysis
1. How are agricultural cooperatives structured in Rwanda?	<ul style="list-style-type: none"> ▪ Key-informant interviews ▪ Questionnaires 	<ul style="list-style-type: none"> ▪ Organizational structure of agricultural cooperatives in Mwendo sector, Rwanda 	<ul style="list-style-type: none"> ▪ Comparative analysis
2. What are the factors influencing agricultural production cooperative in Rwanda?	<ul style="list-style-type: none"> ▪ Questionnaires ▪ Focus group discussion ▪ Key-informant interviews 	<ul style="list-style-type: none"> ▪ Descriptive information on different factors enhancing agricultural production. ▪ Constraints facing cooperatives 	<ul style="list-style-type: none"> ▪ Descriptive statistics (percentage, frequencies) ▪ Cross-tabulation and chi-square tests ▪ Summary tables
3. What are the benefits of belonging or not belonging to co-ops in Rwanda?	<ul style="list-style-type: none"> ▪ Questionnaires ▪ Focus group discussion ▪ Key-informant interviews 	<ul style="list-style-type: none"> ▪ List of benefits and non-benefits of cooperative members ▪ Why people belong to cooperatives other do not 	<ul style="list-style-type: none"> ▪ Descriptive analysis (frequencies and percentage) ▪ Theme and content analysis

Chapter Six

Results and discussion

The main purpose of this study was to explore the effectiveness of agricultural cooperatives in improving income (food and monetary) of farmers and explore implications for food security. In order to respond to the core research problem, the study aimed to establish three objectives that were as follows:

- How are agricultural cooperatives structured in Rwanda?
- What are the factors influencing production in agricultural cooperative in Rwanda?
- What are the benefits of belonging or not belonging to a cooperative in Rwanda?

6.1 Organization of cooperatives

Information on organization of agricultural cooperatives was gathered by using questionnaires, focus group discussions and key-informant interviews. Prakash (2003) lists four main aspects of cooperative functioning: 1) Members are crucial as founders of their cooperative, which they own, control and manage. They are also user-benefited. 2) Cooperative organizational structure is autonomous but operates under the government structure that provides a legal identity to the cooperative. 3) Management of the cooperative is by board members and employees of the cooperative, through which good management makes the organization efficient and effective. 4) The cooperative has a community dimension through linkage to societal structures in terms of sponsoring cooperative members and cooperative leaders. All of these aspects will be taken into account in the overall conclusions arrived at in this study as to role played by cooperatives in food production.

Members join cooperatives in the hope of becoming more economically and socially stable. The cooperatives that participated in the study were mentioned in relation to the challenges faced by people in the community, including poverty, livelihoods and food security. Government sensitization inspired members to register their cooperatives and become formal organizations to qualify for government and non-government funding and training and for the sake of social cohesion or mutual help. Members own and manage their groups.

6.1.1 Demographics of COCUANGA Pineapple Growers Cooperatives

Table 6.1 indicates that in the COCUANGA pineapple-growing cooperatives in Mwendo sector, gender is equally distributed. Farmers attributed the gender balance to the relative youthfulness of the cooperatives' members, with a majority (60%) of the members being single. Being single makes it easier for both males and females to participate in agricultural cooperatives as they are not burdened by family responsibilities, and they join the cooperative in order to seek employment and money for solve their own problems like buying clothes and livestock, and building their houses for their future families.

Table 6-1 Demographics of COCUANGA pineapple cooperatives, 2013

Variable		Frequencies	Percentage
Gender	Male	25	50
	Female	25	50
	Total	50	100
Age	20–30	27	54
	31–40	15	30
	41–50	3	6
	51–60	4	8
	61–70	1	2
	Total	50	100
Marital status	Single	30	60
	Married	20	40
	Total	50	100
Level of education	Never been to school	1	2
	Incomplete primary	3	6
	Complete primary	31	62
	Secondary school	10	20
	University	5	10
	Total	50	100

COCUANGA cooperative chooses pineapples as a cash crop with the intention of generating money (Develeteret al., 2008), and the income received was used for social purposes like paying for transport to visit friends and other mutual activities. However, the participants reported that they only received money from selling their produce, and that micro-financiers were reluctant to work with small-scale farmer cooperatives. Findings on income for smallholder agricultural cooperatives confirm that the main intention of cooperatives is to improve income and livelihoods of their members in order to meet common economic, social and cultural needs (Novkovic & Power, 2005).

Data on education showed that although 2 per cent of the cooperative members in COCUANGA had not been to school, and 6 per cent had not completed primary school, the majority (62%) had attended and completed primary education. This is almost in line with government figures for 2010 that give the proportion of pupils who started Grade One and reached the final grade of primary school as 78.6 per cent (NISR, 2012).

Twenty per cent of cooperative members had achieved secondary education and 10 per cent had gone on to university level. This education provides a chance to improve the performance of agricultural cooperatives, since educated people have a greater capacity for acquiring and implementing new knowledge gained through training. Mushobozi & Santacoloma (2010) make the point that trainings target groups of people seeking help to resolve their common problem for achieving their socio-economic development goals. Trainings extend and develop capabilities for better (agricultural) job performance and transfer behaviour, attitude, new knowledge, and skills for performing a particular role in the workplace.

6.1.2 Demographics of COPALE peas growers cooperative

Demographic data for the COPALE cooperative (Cooperative des Agriculteurs des Legumes [Legumes Growers' Cooperative]) was obtained predominantly from questionnaires and results are summarized in Table 6.2. Firstly, the results show that the number of female members' was 27, slightly greater than number of male members 23 and that more than a half (25) of the members were in the group age 51–60 years. This may have a positive impact on the cooperative as well as on household food production because many women are involved in agricultural activities and 80 per cent of the food is supplied by small scale farmers (FAO, 2011). However, farming women face constraints in decision making due to lack of farming knowledge, belief that women are subordinate to male counterparts, and illiteracy (Chayal *et al.* 2013). Thus, being the majority in the cooperative can give women a better chance of making decisions in farming. Furthermore, a stark difference to the pineapple cooperative, COPALE' membership was mostly much older with the majority being in the 41-60 years old.

Table 6-2Demographics of COPALE cow peas cooperative, 2013

Variable		Frequencies	Percentage
Gender	Male	23	46
	Female	27	54
	Total	50	100
Age	20-30	2	4
	31-40	9	18
	41-50	8	16
	51-60	28	56
	61-70	3	6
	Total	50	100
Marital status	Single	2	4
	Married	48	96
	Total	50	100
Level of education	Never been to school	5	10
	Incomplete primary	15	30
	Complete primary	28	56
	Secondary school	2	4
	Total	50	100

Secondly, apart from two who were still single, members were married and this favoured cooperative participation as members were less likely to abruptly migrate to town. Participants explained that growing vegetables helped to improve household nutrition because one part of the harvest goes to the market for cooperative income generation (savings) and another is shared for feeding their households.

Thirdly, the majority (56%) of cooperative members had completed primary education and 4 per cent had attended secondary education. The respondents suggested that education helped them to understand techniques like application of fertilizer, planting, etc., that increase food crop production and that they stimulate the adoption of new techniques and innovation in agriculture (Oladeebo & Masuku, 2013).

6.1.3 Demographics of COAGRIMA maize growers' cooperative

COAGRIMA cooperative (Cooperative des Agriculteurs des Maïs [Maize Growers' Cooperative]) included both men and women, with a 58 per cent predominance of men (see Table 6.3). These gender demographics coincide with findings by Majurin (2012) that primary cooperatives in East Africa are dominated by men. Men are particularly involved in cooperatives that concentrate on traditional cash-crop or export-crop cultivation. Although, women provide 60 to 80 per cent of labour in agriculture and produce food both for

household consumption and for sale, they do not have access to the productive resources like land, skills and financial credits (Adeyini, 2010).

Table 6-3 Demographics of COAGRIMA maize cooperative, 2013

Variable		Frequencies	Percentage
Gender	Male	29	58
	Female	21	42
	Total	50	100
Age	20–30	2	4
	31–40	7	14
	41–50	11	22
	51–60	18	36
	61–70	10	20
	71–80	2	4
	Total	50	100
Marital status	Single	0	0
	Married	50	100
	Total	50	100
Level of education	Never been to school	7	14
	Incomplete primary	22	44
	Complete primary	19	38
	Secondary school	2	4
	Total	50	100

Age of members ranged from 21 to 80 years, with a predominance of older adults making up the membership two members in the 71–80 age group, who would not normally be regarded as still active were also amongst the membership. The education figures show that 19 members had completed primary education and only 2 members had attended secondary education. A large proportion (58%) of cooperative members was illiterate; this would imply that farmers would find it more difficult to adopt new farming technologies geared at improving agricultural production. Aphunu and Otoikhian (2008) argue that education plays a key role in agriculture as it creates a positive mental attitude and behaviour, making it more likely that member will adopt modern farming creativity and innovations which boost agricultural productivity.

6.1.4 Structural organization of cooperatives

According to literature a primary cooperative is made up of individuals working together for achieving specific tasks and activities. To coordinate these activities a structure and system are needed and they define roles for each person that facilitate decision making (Tchami,

2007). All assessed cooperatives in this study are agricultural cooperatives and each cooperative has its own internal organizational and system of working to achieve its targets. However, there are many similarities between cooperatives such as their way of voting their leaders and the way they make decisions, and also differences such as their committees and the number of work sessions per week. The organization of the cooperative is described in its rules but all cooperatives operate under Rwandan government guidelines.

Data pertaining to the organization of cooperatives was obtained using a mixed methods approach as detailed before. These included questionnaires, observations, review of the Rwanda's Co-operative Act and interviews. All matters relating to cooperatives in Rwanda are in responsibilities of Rwanda Cooperative Agency (RCA) which is a government institution in charge of government policy implementation pertaining to cooperatives. The organization was established by law NO 16/2008 of 11/6/2008 where it stipulates the resolutions of the meeting of RCA are signed by its members and sent to the Minister in charge of cooperatives. Rwanda's co-operative act (RCA, 2011) says every registered cooperative has to mention by law, the type of general assembly and the frequency of general assemblies. According to the RCA, the cooperative society is led by elected members of the co-operative who form the management committee and are responsible for managing and making decision on policy matters. These decisions are made and communicated in the assemblies. Furthermore, matters pertaining to cooperative policies and laws are decided and modified in the cooperative's general assembly.

6.1.4.1 Similarities between cooperatives

Farming land is in short supply in the areas studies. Although farmers own small land pieces, this is not enough for increasing production. Therefore, because small-scale agricultural cooperatives in Mwendo sector have the challenges of having a shortage of land, this that pushes them into renting farming land from their neighbours and farm collectively in a bigger area as a cooperative. These cooperatives show a number of similarities as they operate under the same national cooperative rules. Firstly, the way the cooperative members vote for their leaders is similar. Results confirmed that the election of leaders in cooperatives is done at a general meeting. Every cooperative member capable of leading the cooperative is allowed to be a candidate and each member has only one vote. In line with cooperative principles, Henry (2005) notes that every cooperative member has an equal say in everything happening in cooperative, and regardless of the amount of his/her investment, every member

has exactly one vote. There is thus democratic participation and control by cooperative members.

Secondly, in all cooperatives, cooperative members reported that when they have a difficult problem that problem is raised and debated in a general assembly before making any decision on it. Minor problems are dealt with in a meeting that is held after every communal work session. Briefly, they all describe a similar approach to solving problems. The ICA (2013) emphasises that member participation is the cooperative sector's most valuable asset; the individual member in a cooperative plays the role of participant not only in cooperative production work but also in cooperative decision-making. Moreover, cooperatives enable individuals to develop skills and confidence in democratic participation in decision making both within the cooperative and in the political processes of community government (Dobrohoczki, 2006).

Thirdly, cooperative structure relies on active and on-going participation of members, where the democratic nature cooperative is implemented. A general assembly or general meeting is the foundation and birthplace of all the bodies that are associated to it (Tchami, 2007). Guidelines published by the Rwanda Cooperative Agency specify that a general assembly of members is the highest governing body of the cooperative. It is in these meetings that the other organs of the cooperative (board of directors/management committee, supervisory committee and employees or technical staff) are set up or elected (RCA, 2011).

Key-informant interviews indicated that support for cooperatives was mainly centred on building their organizational capacity. They reported that they give support to cooperatives by providing training to cooperative members on laws governing cooperatives, financial management and leadership and structures of cooperatives. However, not all cooperatives in the Mwendo Sector received this training due to the high number of cooperatives and inadequate personnel and budget allocations for capacity building of cooperatives.

Members of cooperatives reported that they elect and support the various structures in their cooperative in the expectation that these will enable them to get out of poverty through sharing social profits as well as economic and cultural benefits. Figure 6.1 shows that in the COCUANGA cooperative the structure was based on the general assembly, from which executive committee and auditing committee were derived.

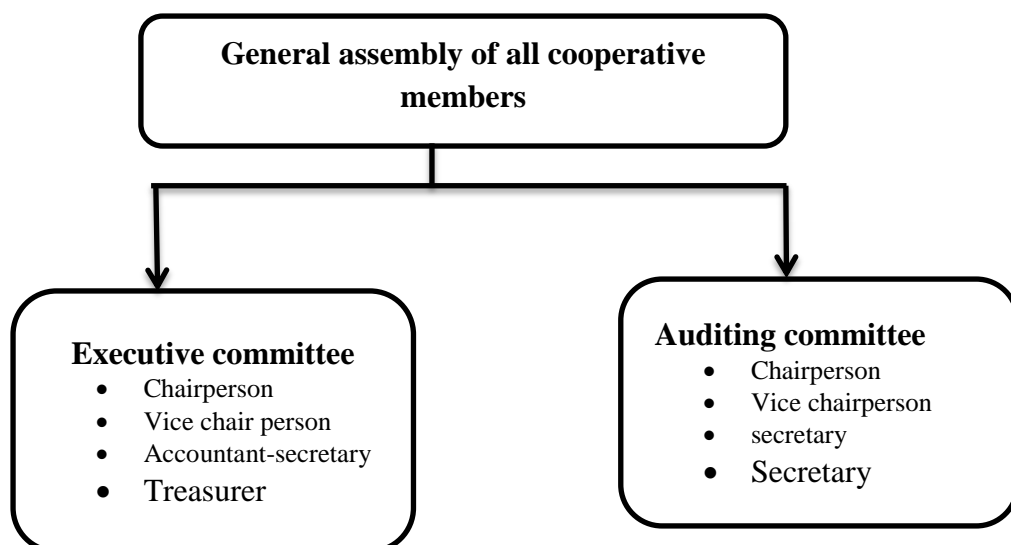


Figure 0-1 Structure of COCUANGA cooperative

Figure 6.2 illustrates the structure of the COPALE and COAGRIMA cooperatives, in which a disciplinary committee is added to the executive and auditing committee and is an important organ in supporting proper coordination and implementation of cooperative objectives. Thus, all members of cooperatives participate in the life of the cooperative either as a committee member or as an ordinary member.

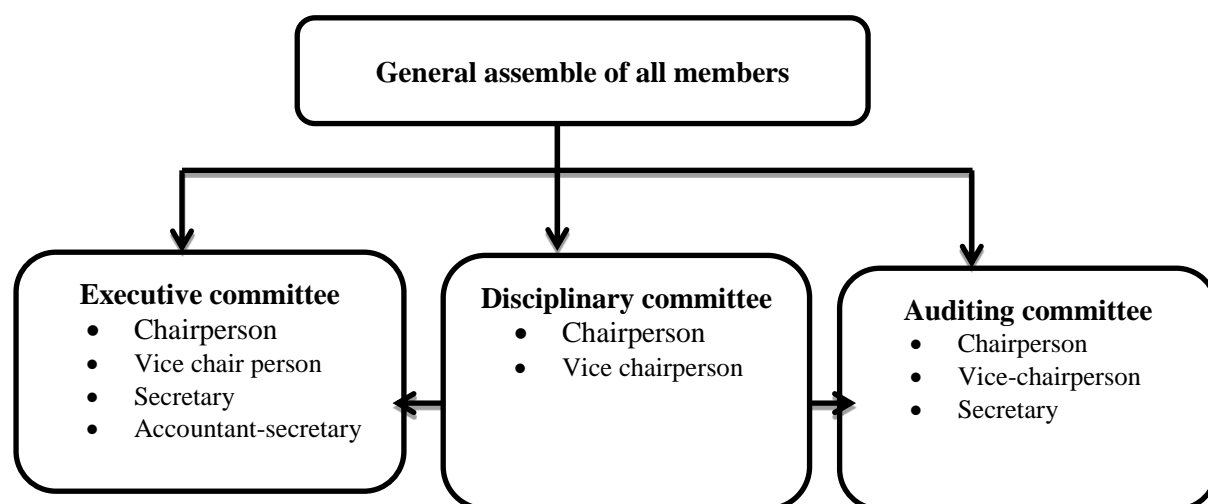


Figure 0-2 Structure of COPALE and COAGRIMA Cooperatives

6.1.4.2 Organisational differences between cooperatives

All cooperatives in Rwanda operate under guideline rules from the Rwanda Cooperative Agency (RCA) and these guidelines are apparently similar to international cooperative guidelines (RCA, 2011). (Prakash, 2003) noted that cooperative structures resemble the government cooperative structure in the country where they are based. Visited cooperatives

remarked that in addition to guideline rules from the Rwanda Cooperative Agency, cooperative members also draw up their internal rules for proper coordination and attainment of their aims. These internal rules supplement national rules rather than contradicting them. Tchami (2007) stresses the importance of internal rules in a cooperative as they represent its contributions. Rules vary from one cooperative to another according to their various individual objectives and bring order in the cooperatives as they are drawn up by cooperative members who are also implementers.

The research found that cooperatives differed in the number of work sessions per week, dedicated to doing active labour on farms. Apart from COCUANGA (pineapples) which worked twice a week, other cooperatives worked once a week and some of these members claimed that working once a week was not enough for them to achieve their production goals.

6.2 Factors influencing agricultural production of cooperatives

Agriculture is the main source of livelihoods in Rwanda and the government has encouraged farmers to work in groups (Byaruhanga, 2013). For this reason, some farmers have chosen to form agricultural cooperatives with the aim of increasing production and gaining government support. Although cooperatives face ups and downs in their operations, information obtained in this research through survey questionnaires, key-informant interviews and focus group discussions identified factors that had a positive influence on agricultural cooperative production.

There are many factors that contribute positively to agricultural production among cooperatives (Awan & Mustafa, 2013). Findings derived through the use of Pearson Chi-square (see Table 6.4) show a relationship between dependent variables of harvest (kg harvest per season) and independent variables like equipment used and kind of training received by farmers and cooperative organizations. Other factors that determine the operation of agricultural cooperatives include government assistance, inputs used in production and age of farmers. In addition, participants reported that extension officers, marital status and level of education of cooperative members played an important role in their productivity.

Table 6-4 Factors influencing agricultural production of cooperatives (sample size, n=150)

Variables	Value	Df	Significance
Equipment used in agriculture	150.000 ^a	3	0.001
Kind of training received	150.000 ^a	3	0.001
Cooperative organization	145.633 ^a	3	0.001
Kind of government assistance	117.619 ^a	9	0.001
Inputs used in production	100.571 ^a	9	0.001
Age	80.682 ^a	15	0.001
Service provided by extension officer	75.903 ^a	12	0.001
Marital status	68.028 ^a	12	0.001
Level of education	48.377 ^a	12	0.001

Ayaresh (2011) notes that in agriculture a number of non- agricultural factors may affect production, among them are being political, managerial and socio-cultural factors. Economic, educational and psychological factors are also important in improving agricultural production. The Rwanda Co-operative Agency play a role is facilitating the political and managerial factors to some level while the capacity related such as internal management are internal to the co-operative and yet require external support to improve.

6.2.1 Equipment used in agriculture

Equipment used in agriculture is particularly significant for improving agricultural productivity since it facilitates soil cultivation, crop planting, weeding, fertilizing, irrigation and harvesting. In addition to the benefits offered by more advanced equipment, other changes in tools and work methods significantly reduce human burden and fatigue and improve farm productivity (Kumar, 2011). In Rwanda, the hand hoe is traditionally the main tool used in agriculture. All of the assessed cooperatives reported using hand hoes in cultivation as their primary and most important tool. The results show that there is a relationship between equipment used in agriculture and agricultural output in kilograms harvested (chi-square =150.000, df=3, p<0.001). Members reported using hand hoes in their production as last option in the absence of improved tools like tractors, dragged teeth, animal-drawn equipment, etc.

Equally important, key informants reported that cooperatives needed more productive cultivation implements; in particular they needed tractors to replace the traditional hand hoe. There was one tractor available for hire in Ruhango District but the high charges were more than the cooperatives could afford. Focus group informants confirmed that cooperatives provided benefits but said they would be more advantaged if the government subsidies

included tractor provision, particularly for ploughing. Use of machinery such as tractors would speed cultivation, enable cooperatives to plant in good time and reduce farmer fatigue; agricultural efficiency would be improved and agricultural development would be accelerated (Odey *et al.* 2008).

In addition to the hand hoe, cooperatives also made use of watering cans supplied by the Food for the Hungry International (FHI) for irrigation. Farmer respondents said that watering cans enabled them to plant vegetables during dry seasons but emphasized that not having an irrigation system was a big challenge to their production. Key informants noted that although irrigation systems would be an important technological advance they would not insulate cooperative farmers from the harmful effects of climate change on production and profitability. Normal annual rainfall in Mwendo Sector is around 1000 to 1300 mm, distributed into two agricultural seasons (NISR, 2010).

6.2.2 Level of education and kind of training received in cooperatives

The second factor influencing agricultural production of cooperatives is level of education of the members and kind of training received. Using Pearson Chi-square test, the results show a clear relationship between level of education and production output (chi-square = 48.337, df = 12, $p < 0.001$). A similar relationship was also found between training received in the cooperative and production output (chi-square = 150.000, df = 3, $p < 0.001$). Nwankwo *et al.* (2012) found that lack of training and educational opportunities prevent cooperatives from maximizing production and profitability.

Key informants listed training given to cooperative members on aspects such as leadership, accounting, cultivation of crops (maize, vegetables, and pineapples), and compost production as core elements in increasing production outputs of the Mwendo cooperatives. However, 12.7 per cent of cooperative members did not receive any kind of training and those who received training complained that it was not sufficient. They need more training and observation trips to acquaint them with new ideas for cooperative production and profitability, but budget constraints limit this possibility.

Focus group respondents highlighted skills acquisition as one of the many benefits they derived from the cooperatives. Skills gained from trainings were used not only in cooperative production but also in household production and management, such as making compost for household crop production and household planning for the future. Unfortunately, cooperative

members reported that they need more training to boost production and strengthen their cooperatives because most of them are still in the early stages of growth. Also, members recommended training in project design and management for running their own income generating projects and in livestock production to supplement crop cultivation in terms of fertilizer provision.

In three of the cooperatives, a majority (52.0 %) of members had completed primary education and 12.6 per cent had gone on to secondary or tertiary education. Gasperini and Acker (2009) argue that the education is a significant key asset enabling rural household to escape from illiteracy and poverty and promote food security. Education and training are among the core principles of cooperatives (Ortmann & King, 2007), and agricultural training to boost crop production by smallholder organization members is more effectively absorbed when trainees (cooperative members) have been educated (Ngugi & Kariuki, 2009).

6.2.3 Cooperative organization

Cooperative organization is inscribed in the rules established and confirmed by cooperative members. These rules provide the constitution that guides cooperative structure and cooperative activities (Tchami, 2007). The study showed a significant and positive relationship between cooperative organization factors and agricultural output at level 1 per cent (chi-square 145.633, $df = 3$, $p < 0.001$). Schotanus *et al.* (2010) emphasise that internal organization of group members is one of the key success factors in the coordination of activities and communication, and this requires every member to sufficiently commit and contribute his or her effort.

Key informants noted certain organizational changes in the cooperatives in Mwendo Sector, particularly in relation to leadership and management, but said that a lot still had to be done to increase cooperative funding, production and good governance. These findings correspond to findings by Chibanda *et al.* (2009) that optimal making and implementing of decisions in a cooperative depends on transparency, accountability and participation of all members during these processes.

Not all cooperatives in Mwendo Sector had the same internal organization, resulting in various disadvantages. Sixty-six per cent of respondents mentioned that the organizational structure of COCUANGA cooperative did not include disciplinary committees such as those in the COPALE and COAGRIMA cooperatives. The presence of this structure safeguards

and promotes internal motivation like commitment, trust and altruism of members. Discipline in the other cooperatives is assured by a supervisory committee and penalties are better accepted (not regarded as punishment), thereby maintaining order and increasing the cooperative resources (Mansfield, 2005). Basically, all cooperative supervisory and management committees are elected by all cooperative members and in return work for the interest of members (Tchami, 2007).

6.2.4. Inputs used in production

Agricultural inputs are crucial in farming systems and inadequate investment in inputs reduces production growth (Zepeda, 2001). Cooperative members in Mwendo Sector confirmed the role of inputs in their operations, and significant relationship results using Pearson chi-square test showed a significant relationship between agricultural inputs and outputs in the cooperative operations (chi-square = 100.571, df = 9, $p < 0.001$). This finding is consistent with findings by Aregay (2012) and proved that farmers apply productive inputs like fertilizer and irrigation to boost production with the aim of fulfilling the needs of the family. However, the use of fertilizer requires money which may be needed for other household purposes. Yuan (2011) concluded that agricultural output is dependent not only on inputs such as fertilizer, irrigation, agriculture machinery power, manpower and land but also by other factors such improved cultivars, temperature, precipitation, etc., some of which are beyond human control.

In Rwanda, some inputs like fertilizer and maize seeds are currently subsidized by the government (Rwanda Agriculture Board) but group discussions revealed members' concerns that government obliges them to grow improved seeds which are sometimes supplied late or are not favourable to local soils. One key informant (sector extension officer) also noted fertilizer diversion in some cooperatives which reduces their production. Findings statistically showed nonetheless that fertilizer, improved seeds and pesticides represent a significant share (52.7%) of inputs used by cooperative members in their production in Mwendo Sector.

Key informants also noted that the low production is linked to low quantity of inputs, particularly in regard to fertilizer and improved seeds, confirming Ortmann's (2007) for instance that soil needs fertilizer and improved seed in order to generate a significant yield. However, respondents also pointed out that low agricultural productivity is related to changes in rain seasons and inadequate meteorological services in Rwanda which could give better

guidance for farming activities – the country being located as is in an equatorial zone where rain is available. While the co-operatives are willing to enlarge and diversify their produce for sustaining food security for cooperative members, they are constrained by climate change as well as vagaries of weather that disturb farming activities (Sasson, 2012).

6.2.5 Age and marital status of cooperative members

Age and marital status in agricultural production are meaningful. The findings revealed a positive and significant relationship between age of cooperative members, marital status of members, and agricultural production (chi-square = 80.682, df = 15, $p < 0.001$; chi-square = 68.028, df = 12, $p < 0.001$). Age of cooperative members was an independent variable and showed the highest number of respondents as being the 51–60 age group, representing 33.3 percent of the members in the three appraised cooperatives in Mwendo Sector. This indicates that older people are substantially more involved in farming activities than young people. In contrast, the national demographic for Rwanda shows youth (<35 years old) at 78.4 per cent of total population, against 18.6 per cent of total population are between 36–65 years old – the remainder being those who qualify for old age pension (NISR, 2010).

Remarkably, one of the cooperative (COCUANGA) in Mwendo Sector is predominantly composed of young residents. This constitutes a significant strength for this particular cooperative in that labour-intensive activities may sometimes be too demanding for older people and also in that younger people more readily adopt new crop varieties and new technologies for higher yield, with important consequences for rural poverty reduction, employment creation and food production (Oyesola & Obabire, 2011; van der Geest, 2010). However, only 11 people in COCUANGA cooperative were married.

Two other cooperatives were dominated by adult members with only 2 people still single. Key informants emphasized that married people are more serious in cooperative participation compared to single members. The reason may be that married members less likely to migrate than single members, and if one partner is absent during cooperative work the spouse can participate on that member's behalf. This follows cultural family practice, where married people traditionally receive assistance from their spouses in farming activities (Oyesola & Obabire, 2011). Focus group discussions also indicated that family members target their cooperative incomes differently in tackling some household issues like buying *mituel de santé* (medical insurance), seeds, clothes, and household and school materials.

6.2.6 Government assistance and extension services

All studied cooperatives share one extension officer, who provides services not only to cooperatives but also to other farmers in Mwendo sector. As one of key informants, he confirmed that he could not be available at all times for cooperative demonstrations. Apart from cooperative representative meetings or trainings, he visits every cooperative once per season and emphasised that one visit is not enough for improving cooperative production. Results of this study showed a positive and significant relationship between extension officer services and cooperative harvest (chi-square = 150.000, df = 3, $p < 0.001$). Owombo *et al.* (2012) argue that frequent visits by extension agents help transfer technologies to farmers through training in the use of updated techniques like application of fertilizers and use of improved seeds, and advice to farmers on how to access and use machines and other agricultural equipment.

Equally important, this study showed a significant relationship between government assistance and production output in collective farming ($p < 0.001$). Respondents cited government assistance they had received in relation to agricultural policy, provision of extension and cooperative officers, and lobbying for sponsors, but they also wanted government to reduce agricultural credit interest rates. Another request was for an extension officer dealing specifically with cooperatives, because the current extension officer was too often unavailable due to other commitments in the local municipality.

6.2.7. Cooperative analysis of effectiveness

Analyzing the factors influencing the effectiveness of agricultural cooperatives was done through the help of conceptual framework presented in the Figure 3.1. When comparing the three cooperative shown in Table 6.5 against the requirements of effectiveness of agricultural smallholder cooperatives. The results find that all three cooperative do not have the capability of raising their financial resources. They all depend on their own contribution and sales of cooperative produces.

Government does not sufficiently inject any financial assistance in the cooperative and the bank credit interest rate is high which still fear cooperatives to barrow money from the bank. Furthermore, low education level of members precludes them to get information access on sources of funds. Therefore, cooperatives do not achieve all their goals.

Analysis of cooperative operations shows that all cooperatives are hampered by possession of small land that limits their production. Challenges also include lack of technology in production, transport of produces to the market where low prices do not commensurate the efforts used by farmers. Few free-riders were found in COCUANGA cooperative but this does not avoid good participation in cooperatives. However, inputs like improved seeds are used in all cooperative. Apart from COPALE cooperative others make compost and are able to use it. Only COPALE work twice a week other have common work once a week which does not give enough chance to produce enough quantity.

Results in Table 6.5 show good coordination and proper communication of cooperative institutions resulting in cooperative discipline and effective works, the availability of cell phones in the cooperative members facilitate communication. In addition, transparency and accountability are also assured. However, low literacy level found in COPALE and COAGRIMA result in having no clear cooperative vision. All cooperatives work without clear framework. Although, all cooperative data are recorded in their books.

Cooperative displayed a good problem solving where any issue is raised and debated in cooperative meeting before its implementation. That system enables accountability and proper decision-making. This contributes to the good organization and prevents conflicts within cooperatives

Table 6-5 Comparative effectiveness of evaluated cooperatives

Elements for cooperative effectiveness	COCUANGA	COPALE	COAGRIMA
Financial management <ul style="list-style-type: none"> Ability to mobilize resources Proper use of financials 	<ul style="list-style-type: none"> Financing from own contribution and sales from produces Lack of access to credits -No full information on the sources of funds 	<ul style="list-style-type: none"> Financing from own contribution and sales from produces Lack of credit access No information on sources of funds 	<ul style="list-style-type: none"> Financing from own contribution Sales from produces Lack of access to credits No application made requesting funds due to lack of information
Operations <ul style="list-style-type: none"> Participation of members Adoption of technologies Use of inputs Improved market access Timetable of work processes 	<ul style="list-style-type: none"> Production of pineapples Few free-riders Production hampered by lack of technology (hand hoe, no irrigation system) Use of improved seed, compost Market available but challenges of transport and low price Work timetable is once a week Lack of land hampers production 	<ul style="list-style-type: none"> Production of peas Full participation Lack of technology (use of hand hoe, no irrigation system) Use of improved seed, pesticides Market available but challenges of transport and low price Work timetable is twice a week Small land hinders productivity 	<ul style="list-style-type: none"> Production of maize Good participation of members Production hindered by lack of technology (hand hoe, no irrigation system) Use of improved seed, compost Market available but challenges of transport and low price challenges Work timetable is once a week
Leadership <ul style="list-style-type: none"> Clear vision Setting of legal framework Good coordination and proper communication Transparency and accountability in governance Discipline 	<ul style="list-style-type: none"> Vision of factory construction No clear framework Record keeping For surprise activity communication through phone call. Discipline 	<ul style="list-style-type: none"> Absence of clear vision Lack of strong framework Record keeping For surprise activity communication through phone call 	<ul style="list-style-type: none"> No clear vision due to the high number of illiteracy No clear framework set Record keeping For surprise activity communication through phone call
Decision making <ul style="list-style-type: none"> Good mechanism of problems solving Accountability for decisions Decisions favour cooperative interests 	<ul style="list-style-type: none"> Problems and decisions are debated and decided in a meeting after work. Surprise decisions made by committee 	<ul style="list-style-type: none"> Problems and decisions are debated and decided in a meeting after work. Surprise decisions made by committee 	<ul style="list-style-type: none"> Problems and decisions are debated and decided in a meeting after work. Surprise decisions made by committee

6.3 Benefits of cooperatives

Information on benefits provided by the agricultural cooperatives was obtained from questionnaires completed by respondents from the three selected cooperatives, through focus group discussions, and from key-informant interviews. Discussions and analysis of the reported benefits in all cooperatives centred on the same issues in each case, encompassing farm guidance, income and markets, and inputs supply. The benefits cited were mostly the same, with only a few minor variations in certain instances. The chief benefits cited by cooperatives embrace the issues of government assistance, income and production. Also, trainings on agriculture, skills and social benefits were reported to be benefits. Furthermore, the reasons why people join cooperatives and perception of non-cooperative members are herein explained.

6.3.1 Income

Rural farming in Rwanda is mainly characterised by low income and low resources. The main reason for this is that farmers' holdings are small and scattered, which makes it difficult for them to pool their resources in a way that would enable them to boost farm income and improve their livelihoods (Ibitoye, 2012). Agricultural cooperatives members in Mwendo Sector reported that they own very small holdings and have jointly cooperated with the aim of boosting income for their households.

Apart from agricultural income, distance from infrastructure means that few other possibilities of income generation are open to these farmers. For instance, the locality does not have electricity or macadamized roads. Other sources of income in the locality that respondents did mention were selling household livestock, selling household crop harvest and income from the Vision 2020 Umurenge Programme (VUP) which is a government programme intended to lift poor people out of poverty. Salary and wage income was also noted as a small additional source of money for the population living in Mwendo sector. Using field situation analysis, the researcher observed that people begin developing non-farming activities as a way of earning a living.

Agriculture was described as driving household income in the local municipality (NISR, 2012) and in low-income families, with improvement of income and employment as key elements for development of household food security (Tarasuk & Loopstra, 2013). Cooperatives are therefore one important way for individuals to obtain livelihoods and

household income. Cooperative income is derived from members' shares and from selling produce. After harvest and selling, the members decide on retained income which deposited in the bank as savings, and the remaining money is equally distributed to the members.

The money received from cooperatives has really assisted members in tackling some challenges. Table 6-6 presents findings on use of cooperative income in a household. In all cooperatives, participants unveiled that the use of cooperative income in a family is predominantly directed to buy medical cover of household members, home appliance and food items that are not produced or grown in small quantity. Furthermore, seeds and livestock were purchased for agricultural activities not related to the co-operative.

Table 6-6 Use of cooperative income in a household, 2013

Use of income from cooperative	COAGRIMA		COPALE		COCUANGA	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Buying seed and livestock for my own purpose away from the co-operative	6	12	6	12	4	8
Purchasing of school materials and support in social activities	15	30	3	6	8	16
Buying home appliance, medical cover, cloths and food items	29	58	41	82	38	76
Total	50	100	50	100	50	100

Findings show that a large percentage (82%) of income in COPALE is used in households to buy medical cover, home appliances, clothes and some foodstuffs. About 58 per cent of income in COAGRIMA and 76 per cent in COCUANGA are spent on the same issues (home appliances, medical cover, clothes and food).

On the other hand, cooperatives members explained that money from cooperatives helped them to buy school materials for their children and send them to school. In addition, money is used in supporting different social activities in the community, particularly for cooperative members and their relatives. Use of income is not the same in all cooperatives. COAGRIMA

members spend 30 per cent of income from the cooperative on school materials and social activities, whereas the corresponding figure for COPALE members is only 6 per cent, and for COCUANGA members it is 16 per cent.

Cooperatives also help their members to access assets for improving their living conditions (Wanyama *et al.* 2008). In Mwendo sector, all cooperative participants use income for their own purposes as well as for cooperative activities. For instance, at household levels, COAGRIMA and COPALE members utilize 12 per cent of income for purchasing seeds and livestock normally used in rural areas for earning a living. On the other hand, COCUANGA members, who are mainly younger people, use only 6 per cent to buy livestock and seeds, and spend a larger percentage (76%) of their income on home appliances, medical cover, clothes and food items.

Even though, cooperatives receive money, they receive little profit and need to raise it. Considering seasonal cooperative income shown in Table 6.7 below, COCUANGA obtain slight high income compared to the other cooperatives and this may reflect that they are growing pineapple which as a cash crop. However, this is income received after selling their produce, without counting retained income in the cooperative. So, it is a cooperative surplus used by members in their household and this occurs two seasons a year.

Table 6-7 Average seasonal income per cooperative member

Cooperatives	Income received from cooperative per season per person. (1Rwf = 645US\$) (Gasore, 2013)
COCUANGA	54US\$ (n=50)
COPALE	39US\$ (n=50)
COAGRIMA	15.5US\$ (n=50)

Although cooperatives receive money, their profits remain low and need to be raised. Members indicated that lack of bank credit was a big constraint on increase of production. Access to credit is one of determinants of agricultural performance in cooperatives (Byaruhanga, 2013). Access to credit boosts production and sales for the cooperative, and repayment of the borrowed money (and savings bank involvement) instils a culture of saving among cooperative members. Members also mentioned market availability for their produce,

but noted difficulties posed by low prices due to the seasonal production, lack of storage facilities, and high cost of transport to the market.

6.3.2 Production

Agricultural production of the cooperative is the main pillar of its development. To achieve high production rural farmers crucially need basic farm inputs such as fertilizers, agricultural farm equipment, and labour (Gathiaka, 2012). Key informants (FHI and sector extension officer) mentioned that they had arranged some observational field trip for cooperative members and supplied some inputs including seed, fertilizer, animals (goats) for manure, and hoes and pumps. All of these inputs were supplied in order to increase cooperative production, but unfortunately remained less than what was needed.

In all of the assessed cooperatives, one producing peas, another growing maize and one producing pineapples, the cooperative members cited identical challenges (i) excessively small holdings of land ownership (due to high population density), obliging participants to rent farm land – coupled with low use of fertilizer; (ii) lack of irrigation, exposing productivity to fluctuations of climate; (iii) reliance on hand hoes as their main equipment, making tillage and land preparation excessively time-consuming.

Farmers used a combination of fertilizer and organic methods in the plots of COPALE cooperative growing peas, and of COAGRIMA cooperative farming maize. In addition, some of their members had been trained on how to make compost so that they could produce and apply it for enriching the soil and reduce fertilizer expenses. But low input leads to in low productivity (Kaizzi *et al.* 2012), and to increase inputs cooperatives need money to buy them. Notwithstanding the availability of Umurenge SACCO in Mwendo sector, agricultural cooperatives do not have access to the bank credit needed to purchase sufficient agricultural inputs. Only 32.6 per cent of cooperative members in Rwanda obtain inputs from cooperatives and 28.7 per cent of their produce is marketed within the cooperatives (Tumwebaze, 2013).

Although COCUANGA members reported use of improved seeds to increase production, no bank credit was delivered to any of investigated cooperatives for boosting their production capacity or for integration in the agro-value chain. There are three main reasons for this: (i) members do not have adequate skills in borrowing, using and repaying credit; (ii) lack of collateral hinders application for bank credit; (iii) high interest rate imposed by the financial

institutions scares off cooperative members and makes them reluctant to borrow. COCUANGA members also mentioned free-riding in cooperative work as a problem that impeded production; to resolve the problem they planned to retain their scheduled days for working together but with a specific task assigned to each individual member.

6.3.3 Training in agriculture

Agricultural training for farmers' cooperatives has been affirmatively reported as helping to maximize crop production (Nwankwo *et al.* 2012). This study found that cooperative members had received various instances of agricultural training. However, the number of trained members is small and more participants still need to be trained on various cooperative issues. Table 6.8 indicates the kind of training received in different cooperatives. Key informants who were predominantly responsible for giving training highlighted three main challenges: (i) low level of education of some cooperative members who are still resistant to change and want to use traditional methods; (ii) insufficient budget for more frequent training; and (iii) unfavourable geographical location.

Table 6-8 Training received in cooperatives, 2013

Kind of training received	COAGRIMA		COPALE		COCUANGA	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Pineapple growing & seed multiplication	-	-	-	-	30	60
Production of compost	15	30	-	-	15	30
Vegetable & maize growing and field trip	27	54	35	70	-	-
Cooperative rules	3	6	2	4	5	10
Not received any training	5	10	12	26	-	-
Total	50	100	50	100	50	100

Training on seed multiplication and growing and mulching of pineapples in COCUANGA cooperative showed a high proportion (60%) of trained members. Compost is key component in organic farming, so these cooperatives also received training on how to make compost. Thirty per cent of members obtained compost production skills, while just 10 per cent of members were trained on cooperative rules. In COAGRIMA maize cooperative, 30 per cent

of members received training on compost making using cheap organic matter such as leaves, food waste, and crop stems.

COPALE and COAGRIMA members were taught practical skills in nursery bed preparation, planting, and harvesting of vegetables, with 70 per cent of COPALE members receiving the training and 54 per cent of COAGRIMA members. COAGRIMA members were also trained in maize farming techniques with the focus on preparation of soil, planting, weeding, harvesting, drying and shelling of maize. In addition, these trained members in two cooperatives did field trips for observation that they hailed as important in inspiring increase of their cooperative production.

On the other hand, very few COPALE or COAGRIMA members (4%) received training on cooperative rules (4% and 6% respectively). There were also 26 per cent of COPALE members and 10 per cent of COAGRIMA members who reported not having received any training. Respondents explained that cooperative members attended trainings in rotation, which meant that with relatively few training sessions being offered, not all members got their turn. Geographically more accessible cooperatives had an advantage in the scheduling of training. The cooperative training was delivered by FHI, the sector extension officer and Rwanda Cooperative Agency.

Respondents also commented on a need for specific training on the following topics in the interests of good governance and increase of productivity: (i) project design and entrepreneurship to encourage innovative improvements and adoption of additional projects for generating income (Tchami, 2007); (ii) improved agricultural technology and livestock management in order to obtain manure for crops and increase income from livestock; (iii) post-harvest processing and storage of produce while waiting for the market price to increase; (iv) cooperatives rules and leadership; (v) financial management; (vi) composting.

6.3.4 Government assistance

Government policy is the vehicle for all cooperatives and agricultural production in the country (IFAD, 2011). In Rwanda, the government sets policies for cooperatives and, together with donors, delivers some services to the cooperatives. These include provision of fertilizer, seeds, credits, extension services, etc. (Rosegrant *et al.* 2005). Respondents reported numerous benefits which largely coincided for all selected cooperatives. Table 6.9

summarizes the reported government assistance services, their frequencies as well as percentages.

Table 6-9 Benefits from Government Services, 2013

Government assistance	COAGRIMA		COPALE		COCUANGA	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Cooperative officer & sector agronomist	23	46	34	68	29	58
Provide seed & lobbying for sponsors	13	26	16	32	12	24
Financial help	-	-	-	-	9	18
Subsidies of cheap fertilizer	14	28	-	-	-	-
Total	50	100	50	100	50	100

A majority of members (68%) from COPALE (peas) and (58%) from COCUANGA (pineapples) testified that civil servant cooperative officers helped in providing legal documents and guides on cooperative development and that extension officers helped in agricultural skills development (Prakash, 2005).

The study also found that members benefited from free seeds from government assistance and created a good working environment where Food for the Hungry International (FHI) supplied the cooperatives with agricultural equipment such as watering cans, spades and jerry cans. Twenty-six percent of respondents from COAGRIMA reported that free seed plus lobbying for more sponsors from government were some of the important benefits they had received. This figure was 32 per cent for COPALE and 24 per cent for COCUANGA. However, this assistance is very little set against the help needed to boost these cooperatives. Members claimed that seeds provided by government were not always delivered in time because of administration processes, which further impeded cooperative productivity.

On the other hand, government financial help and government subsidies in the form of cheap fertilizer were sometimes substantial. Government financial assistance to the cooperative was reported by 18 per cent of all COCUANGA respondents and 28 percent of COAGRIMA respondents noted the importance of subsidised fertilizer received from government.

6.3.5 Social benefits and social cohesion

Social cohesion is very important if a cooperative is to achieve its objectives, as members need to have a sense of active participation in the development of the organization. Study respondents reported that joint farming activities invigorated their sense of unity. A number of different activities were mentioned as helping to strengthen group cohesion: (i) cultivating, planting, weeding, harvesting and post-harvesting activities; (ii) meetings and talks intended to answer their cooperative problems; (iii) participation and assistance in social activities like weddings, baptisms, funerals and other forms of mutual help. Focus groups also confirmed the importance of this kind of strengthening of social connections between members, noting that social networks were stronger in successful cooperatives than in struggling cooperatives.

Emana (2009) notes that cooperative activities promote a culture of sociability and unity which is really cemented by assistance provided in social and religious activities among cooperative members. In Rwanda, according to Sentama (2009), cooperative work and discussions are particularly important for unity and reconciliation in cooperatives which include both genocide survivors and former genocide offenders or their family members, when negative attitudes are transcended by a common desire for socioeconomic development.

Similarly, 19.3 per cent of respondents commented that cooperatives not only helped to increase crop production, income and skills of cooperative members, but also strengthened social cohesion. Slight differences in percentage were shown among the cooperative selected in this investigation. Twenty-two percent of COPALE and COAGRIMA members mentioned benefits of social cohesion from cooperatives while the equivalent figure for COCUANGA cooperatives was 14 per cent. This low percentage (14%) is explained by the fact that the majority of their members are young people who are less involved in social and religious activities at home.

Furthermore, cooperative members reported that being in groups upgraded social benefits through provision of employment, education (trainings) and economic participation. Also, cooperative elections inculcate a culture of democracy and equality among their members which also spread to and benefit the community (Dobrohoczki, 2006).

6.3.6. Market benefits and challenges

One important agricultural cooperative activity is improving market access for cooperative products and allowing poor farmers to tackle their problems and improve their living standards (Allahdadi, 2011). All the respondents in this study (100%) reported that being in cooperative increased market access for their produce, but they also highlighted two main problems that arise from being located in a poor rural area. The first was that low prices mean that is not enough profit for them to make faster progress. Key informants noted that low prices hampered progress and adaptation, and they attributed the low prices to the lack of infrastructure such as roads, electricity and storage facilities. Farmers all depend on the weather; the harvest necessarily happens at the same time for all the farmers in the locality, and no storage facilities, so supply then outstrips demand which reduces the price. The second problem was transport: poor roads and lack of vehicles make it difficult for farmers to get their produce to the nearest market, where transport cost is not considered in setting prices (Chuhan-Pole & Angwafo, 2011). Meanwhile, Mwendo sector has two open marketplaces where these products are sold.

6.4 Reason to join cooperative

In Rwanda, particularly in south province where Mwendo Sector is located, farmers depend mainly on land for their livelihoods. They reported agriculture as a major source of revenues. However, this activity does not provide adequate livelihoods to the residents due to problems such as high fragmentation of land holdings, with only 0.65ha of appropriate farmland per household and low yields from over farming that depleted soil fertility (Rutunga *et al.* 2007).

Residents therefore chose to join cooperatives in the hope of increasing production by working together, and with the expectation of support from by government and NGOs. Also, as a result of the government sensitization through public meetings and media (radio and TV), people have developed positive attitudes towards cooperatives and realize it is in their interest to join because of the possibilities for training and skills development leading to improved income (Nugussie, 2010). Participants also mentioned joining cooperatives as a way of improving social relations and strengthening unity with their neighbours in the aftermath of the 1994 genocide against Tutsi, which had led some people to stay alone in their families. Again, joining cooperative was seen as a way of creating employment, acquiring a voice in the community, and automatically increases collective bargaining power in the market that enhanced incomes of the members.

6.5 Perceptions of non-cooperative members

Participants reported that they grow a variety of crops such as beans, cassava, maize, bananas, peas, sweet potatoes, carrots, pineapples, cabbages, etc. Any person may voluntarily join an existing cooperative or form a new cooperative (Ortmann & King, 2007). There were, however, respondents who reported not belonging to any agricultural cooperative. In table 6-10 below, a large proportion of these (60%) explained that in a cooperative all members wait for crops to mature before they are harvested, whereas they preferred being able to reap crops for consumption whenever food was urgently needed in the household or for sale when they needed money to solve an unexpected family problem. Fifteen per cent of non-members reported concerns about failures due to cooperative mismanagement. Also, participants commended that cooperative rules are tough; any absence in the cooperative is penalized. So they preferred not to join any cooperative because when they are tired they do not work.

Table 6-10 Summary of results from non-cooperative members (n=20), 2013

Questions	Responses	Percentage
What kinds of crops do you grow?	Beans, cassava, carrots, maize, cabbages, bananas, peas, sweet potatoes, yams, pineapples	100
Do you belong to any agricultural cooperative?	No	100
	Total	100
If not, why not?	In my own farm I can harvest at any time when I am hungry or need money but in cooperative they wait for maturity stage.	60
	I do not want to lose my effort due to poor cooperative management	15
	When I am tired I do not work but in cooperative when a member is absent is punished.	25
	Total	100
Do you find benefits in being individual?	Yes	30
	No	70
	Total	100
If yes, what are the benefits?	Mutual help, during social activities they are helping each other. They are known by local government and are respected	
Would you like to join an agricultural cooperative?	Yes	70
	No	30
	Total	100
If yes, what are the benefit do you expect?	I will get access to the training, more friends and voice in the community.	60
	Gain income from cooperative, government and donors	40
Total		100

However, the majority (70%) of non-members did not find benefits in being individuals and they wanted to join agricultural cooperatives. All of them showed a desire to participate in a cooperative noting that the members of cooperatives get mutual help specifically during social activities like weddings, baptisms and other cultural or religious activities. Also, cooperative members are respected in the community and do not face problems with local government in policy implementation since cooperatives are part of the system used by government for rural development and poverty reduction through creation of employment and increase of agricultural production (Adebayo *et al.* 2010).

In addition, respondents warmly noted the benefits expected once they had a chance to join the cooperative. A large number (60%) reported that in joining a cooperative they expect to benefit from the access to training. Also, participating in cooperative activities would give them more friends, power and voice in the community. A significant number (40%) mentioned that they had come to realize that government and donors in Rwandan agriculture are actually interested in collective farming and that cooperative members received surplus. So joining cooperative would be a way of benefiting from this diversified income. However, there was a problem in the cost of the cooperative share which a new member had to pay in order to be accepted into the cooperative and be on equal terms with existing members (Tchami, 2007).

Chapter seven

Conclusions and recommendations

This research was intended to pinpoint the role of agricultural cooperatives in assisting household food security for members of selected cooperatives (COCUANGA, COPALE and COAGRIMA, farming pineapples, peas and maize) in the Mwendo Sector/Ruhango District. The survey combined both quantitative and qualitative data collection methods. Quantitative data were collected through questionnaires given to cooperative members and non-members from studied areas, while qualitative data were collected using focus-group discussions and face-to-face interviews with key informants. The responses were based on the study objectives. Then, based on data collected, and the results and discussions presented above, the following conclusions and recommendations can be made.

7.1 Conclusions

The study found that agricultural cooperatives provide some benefits to their members. First, government recognizes cooperatives as tool for improving household food production and tries to help them through lobbying for sponsors, financial help, providing advice through cooperative officers and offering agricultural inputs as well as other subsidies. Second, cooperatives provide employment and education that raises the level of agricultural skills among cooperative members through different kinds of training. These benefits make it possible for cooperative members to increase production and access markets which bring in some income for the cooperative and for the members. Third, working together in an organized group creates social benefits. In addition, cooperative work sessions, meetings, discussions and other social interactions such as social and religious activities create social cohesion between members. However, cooperatives also face challenges that include small land size and thus constraining growth, lack of updated equipment like tractors, dependence on rainfall and low market prices not commensurate with the producers' efforts.

This study further found that how the cooperative is organized is also very important and is requires leadership, coordination and communication. The success of agricultural cooperatives is influenced by a number of factors including equipment used in production, age, marital status, educational level of cooperative members, and training received in the cooperative. Furthermore, inputs such as fertilizer, seed, and irrigation significantly influence

production but all of these are facilitated by government policies and by extension officers who assist in their application.

The study further found that cooperatives in the Mwendo Sector study area shared a number of similarities in their structural organization, relating to features such as voting for leaders at a general assembly, resolving their problems through discussion in the meetings, and establishing structural organization during general meeting. Two types of organization structures in Mwendo Sector were identified. One consists of general assembly of all members, executive committee, and auditing committee. The other hand consists of general assembly of all members, disciplinary committee and auditing committee. However, there are differences in the internal organization of the cooperatives, particularly in relation to the number of work sessions per week, where some work twice a week and others once a week.

It was found that some residents were reluctant to join cooperatives for three main reasons: concern about the possibility of wasted effort due to cooperative mismanagement, being afraid of punishment if absent from cooperative work sessions, and worry that they could be faced with seasonal hunger because cooperative harvesting is done when the crops mature while individual farming allows harvesting to be performed at any time food is needed in a household. However, even those who did not belong to the cooperative acknowledged the benefits of cooperative membership.

This research identified a number of benefits obtained from cooperatives by their members. Further research could explore the nutritional benefits for households from agricultural cooperative membership to establish whether households are both food secure and nutritionally secure.

7.2 Recommendations

The study offered lessons pertaining to agricultural cooperatives and their structure in a district in Rwanda. It has identified the benefits to members of cooperatives, their structural organization, important factors affecting their agricultural production and the reasons why some people do not get involved in cooperatives. Some of the points that emerge relate to the support given to the development of collective farming by government together with its stakeholders, and others are for consideration by cooperative farmers themselves. It is recommended that the Rwanda Co-operative Agency take up some lessons from this study and improve their support for growing smallholder performance.

7.2.1 Recommendations to be considered by the government and its stakeholders

The study found that cooperatives played a significant role in improving household food security. The following measure should be given attention by government and its stakeholders for enhancing cooperative effectiveness:

- Facilitate access by cooperatives to agricultural equipment like tractors that would speed up agricultural operations that are dependent on weather condition. This will help growers to plant on time, without delays in land preparation.
- Intensive training should be promoted, by government and its stakeholders, to improve skills of farmers, not only for agriculture but also for animal husbandry and financial management. This will boost production by encouraging farmers to manage their resources and also to rear animals which provide manure for crops.
- Ensure that improved seed is favourable to local conditions and avoid delay in the supply of seed where planting need to be completed in time for seasonal rains.
- Ensure that bank credit interest rates are affordable by farmers. This will make it easier for farmers to borrow money, buy inputs, raise productivity and extend their markets.
- Continue to sensitize non-members on the advantages of cooperative membership, and help them to join cooperatives or create their own for overall national advancement of production, skills, income generation and unity.

7.2.2 Recommendation for cooperative members

Cooperative members should be determined, invest in cooperative assets that may not generate income right away but hoping to receive it in the future. Because members own, control and benefit from their cooperative they should particularly guard against mismanagement of any kind, as failure of the cooperatives will have serious consequences for all of them. Also, members should strive for self-reliance by tackling challenges and look for solutions without relying too much on external help.

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Appendix 1: Survey face-to-face interview questionnaire

RESEARCH QUESTIONNAIRE

This inquiry is intended to investigate the role of smallholder agricultural cooperatives in improving household food security and the factors contributing to their success. Your survey responses will be confidentially kept. Thank you for your participation in this research.

PART I. IDENTIFICATION OF RESPONDENT

Name:

Gender:

Ages (in years):

Marital status:

Level of education:	Never been to school	<input type="checkbox"/>	Incomplete Primary	<input type="checkbox"/>
	Complete primary	<input type="checkbox"/>	Secondary	<input type="checkbox"/>
	Agriculturally vocational trained after completing school	<input type="checkbox"/>	University	<input type="checkbox"/>

Name of the cooperative:

Type of crop grown:

Location (Local Municipality):

Sources of other income:

Role in cooperative: Manager ☐ Committee member ☐ Ordinary member ☐

PART II: QUESTIONS PERTAINING TO ORGANISATION

1. How is your cooperative organized?

.....

2. How do you elect the leadership?

.....

.....

3. How do you make decisions in your cooperative?

.....

.....

4. How often do you meet?

.....

5. What do you think can be corrected in your cooperative?

.....

.....

6. What are the reasons that pushed you to form or join a cooperative?

.....

.....

PART III: QUESTIONS RELATED TO FACTORS ENHANCING PRODUCTION

1. a) What are the sources of your funds?

Own contribution ☐ Bank credit ☐ Sales ☐ Loan from cooperative members ☐

b) Have you borrowed from a bank? Yes ☐ No ☐

c) If not why?.....

.....

.....

In this cooperative

Do you farm on your own and market together ☐

Do you farm one large plot and market together ☐

Do you rent one large plot, farm and market together ☐

Is this a primary ☐ or secondary cooperative? ☐

2. a) Is any of your land used by the cooperative? Yes ☐ No ☐

a) Why?

.....

<p>3. a) Do you have sufficient market for your products? yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>b) If not what do you think is the cause:</p> <p>.....</p> <p>.....</p> <p>c) What constraints do you face in marketing your produce?</p> <p>.....</p> <p>.....</p>
<p>4. a) In your production, which of the following inputs do you use?</p> <p>Fertilizer <input type="checkbox"/> improved seeds <input type="checkbox"/> pesticides <input type="checkbox"/> herbicides <input type="checkbox"/></p> <p>b) If not use, what is the cause?</p> <p>No capacity to purchase them <input type="checkbox"/></p> <p>inputs are found far from your place <input type="checkbox"/></p> <p>lack of knowledge to use them <input type="checkbox"/></p>
<p>5. Do you practice irrigated agriculture ? <input type="checkbox"/> or rainfed? <input type="checkbox"/></p>
<p>6. What is the equipment you use in your agriculture?</p> <p>Tractor <input type="checkbox"/> Irrigation equipment <input type="checkbox"/></p> <p>Hand hoes <input type="checkbox"/> Hand pump <input type="checkbox"/> watering can (watering pot) <input type="checkbox"/></p>
<p>7. Do you receive any government assistance? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>If yes, what kind of assistance is it?</p> <p>.....</p> <p>.....</p>
<p>8. What are the other helps requested from government?</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>9. What constraints do you face in increasing production?</p> <p>.....</p> <p>.....</p>

PART IV: QUESTIONS RELATED TO BENEFITS OF COOPERATIVE MEMBERS

1. What benefits do you obtain from being involved in the cooperative?

Improved production ☐ income ☐ skills ☐

social cohesion/social benefits ☐ none ☐

2. How much do you make per season from farming in the cooperatives?

.....

3. How many kg do you harvest per season;

a) Maize..... Pineapple..... Peas.....

4. How does your household use this income?

.....

.....

5. What would life be like without this income?

.....

.....

6. Have you ever received any training in the cooperative? Yes ☐ No ☐

a) If yes, what kind of training?

.....

b) If not, what do you think it is the cause?

.....

7. What kind of training do you need?

.....

.....

8. a) Do you have an extension officer? Yes ☐ No ☐

c) If yes, how often does s/he visit you?,

d) What are the extension services that s/he is providing?

.....

.....

e) If not, what do you think is the cause?

.....

Thank you for your reliable information and frank collaboration

Appendix 2: Guide for focus group discussion

Q1. What benefits do you obtain from being involved in the cooperative?

Q2. How does your household use income from the cooperative?

Q3. How would you cope without the cooperative income?

Q4. What kind of training do you need/expect in the cooperative to increase food production?

Appendix 3: Guide for key informants' interview

1. How they support (training, inputs) cooperation?
2. How often they visit cooperatives?
3. What change do they see in cooperatives?
4. What constraints are they faced with in doing extension work?
5. What support do they need to improve their work?

Appendix 4: Questionnaire for non-members of cooperative

1. What kinds of crops do you grown?

.....

2. Do you belong to any cooperative? Yes ☐ No ☐

If not, why?

.....

3. Do you find benefits of being individual? Yes ☐ No ☐

If yes, what are they?

.....

4. Do you want to join an agricultural cooperative? Yes ☐ No ☐

If yes, what benefit do you expect?

.....

