

The contribution of agricultural cooperatives to small holder farmers' household income

A Case of COAMV Cooperative, Burera District, Rwanda



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Nsingize Gisele

September, 2013

Wageningen

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Dedication

This thesis is dedicated to the Almighty God for His grace upon my life from the inception of this programme and to my beloved husband **Mr. François Hakizimana** for his love and words of encouragement throughout the duration of my study.

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List of abbreviation and acronyms

BDF	Business Development Fund
BRD	Banque Rwandaise de Développement
CIP	Crop Intensification Programme
COAMV	Cooperative des Agriculteurs de Maïs Dans la Zone des Volcans
FAO	Food and Agriculture Organisation
FGS	Focus Group Discussion
GoR	Government of Rwanda
ICA	International Cooperative Alliance
MINAGRI	Ministry of Agriculture and Animal Husbandry
NAP	National agricultural policy
NGO	Non-Governmental Organisations
NISR	National Institute of Statistics of Rwanda
NPHSCS	National Post-Harvest Staple Crop Strategy
PHHS TF	Post-Harvest Handling and storage Task Force
PPPMER	Projet pour la Promotion des petites et micro entreprises rurales
RCA	Rwanda Cooperative Agency
RSSP	Rural Sector Support Project
USAID	United State Agency for International Development
WFP	World Food Programme

Currencies:

1 EURO 864 Rwandan Francs (RWF) in August 2013

Abstract

In Rwanda, majority of farmers in Burera district are experiencing low income for the sustenance of their households and live in poverty. They have neither access to agricultural inputs nor the minimum post-harvesting skills training to improve production and income level. This situation is more elaborated in small holder farmers which almost the half of rural households have agriculture as their main source of income. To alleviate this problem among small holder farmers, the government of Rwanda, is implementing multifaceted poverty reduction policies through Ministry of Agriculture in which the creation and strengthening of farmers' cooperatives is taking place to enable small farmers to plan, implement market oriented production, processing and marketing of agricultural commodities. The immediate objective of the project was to build the technical and organizational capacity of farmers. In line with this, the purpose of this study was to analyze the contribution of agricultural cooperative to smallholder farmers' income in relation with access to agricultural inputs, access to credit, access to market and postharvest technologies training. The study focused on their sources of income (maize production) and business skill training (training on post-harvest technologies, technical and economic support via small scale credit and loan) for strengthening and raise the income of small holder farmers. The research question was: "What contributions has COAMV Cooperative made towards small holder farmers income ?. Five sub-questions were formulated in line with the main question. To answers these questions, individual interviews with twenty beneficiaries and five representative of COAMV cooperative and one focus group discussion were carried out. The focus group discussion consisted of 10 members of the cooperative. The respondents interviewed were selected among the beneficiaries of COAMV cooperative. The results indicate good contribution of COAMV for its members in accessibility to inputs and training on post-harvest technologies. Challenges highlighted as delays in provision on time for fertilizers and improved seeds by the cooperative. Prices of agricultural inputs are comfortable to farmers. Farmers are no longer practicing traditional farming methods and the post-harvest training leads to increased quality and quantity of maize produce. The accessibility of market is provided by the cooperative at the better price which is higher than the local market. Revenue from the sale of maize are invested into other activities like livestock and the rest contributes to sustain household consumption. The results of the study indicate also that even if there is an increase in income levels of smallholder farmers, there are still challenges related to the income of members. There is shortage of storage space for the cooperative to ensure continuous production and distribution the whole year around. The delay in processing of payments was also indicated as another challenge. Based on these findings, the researcher suggests that the cooperative considers seeking for financial support to build storage facilities. This will eventually enable the cooperative to buy and transform large quantity of maize and raise the income from the sale of maize. The researcher also suggests that the cooperative improves its administrative procedures in order to fasten process farmers' payments in production.

Chapter one: Introduction

1.1 Background of the study

Rwanda is a landlocked country sharing borders with Uganda in north, Burundi in south, Tanzania in east and Democratic Republic of Congo (DRC) in west. The country ranks among the poorest countries worldwide with 34% undernourished, and over 65% of the population living from less than one USD per day, (FAO, 2010). The Rwandan economy is strongly based on agriculture which provides 87% of jobs and 80 % of all exports (MINIGRI, 2009). The available arable land for agriculture is 2,294,380 hectares but around 1,750,000 hectares are actually exploited (NISR, 2011).

According to the Ministry of Agriculture (2010), before 2007 crops were produced for home consumption; less quantity reached the market due to lack of improved seed and fertilisers, insufficient technical assistance in cropping system, postharvest technologies, soil highly degraded by erosion and lack of adequate policies in agriculture. To overcome the above problems the government of Rwanda developed the National agricultural policy (NAP) in 2004 and the National Post-Harvest Staple Crop Strategy (NPHSCS) in 2009 with the aims of moving from subsistence to market-oriented production which was expected to result in both economic growth and increased food security. NAP also aimed at assisting with strengthening the harvesting, post-harvest and handling, trade and storage, strengthening markets and linkages for farmers, and reducing post-harvest losses. The policies also aim at strengthening input distribution such as seeds and fertilisers through farmers' associations and co-operatives that will be closely monitored by MINAGRI.

In Rwanda agricultural cooperatives are viewed as vehicles through which the cooperatives members create employment and expand access to income-generating activities. Members also develop their business potential which includes entrepreneurial and managerial capacities through education and training. Members are encouraged and trained to produce increases in savings and investment, and improve social well-being with emphasis on community development. In Rwanda, cooperatives are considered as key to increase food security and help farmers to cope with challenges and enable them to gain access to markets. Cooperatives also offer services to members as a way of building their capacity where farmers receive training on production techniques and postharvest (ICA, 2013). In 2005, approximately 10,000 cooperatives were identified in Rwanda and 68 per cent were operating in agriculture (Herman, 2012).

1.2 Problem Background

The Government of Rwanda through the Post-Harvest Handling and Storage Task Force (PHHS-TF) is encouraging smallholder farmers to work under cooperatives as a key to ensuring national food security in the country, and at the same time contribute to their household income through agricultural production. A report by the National Institute of Statistics of Rwanda (NISR) highlights that in Burera District approximately half of population is considered poor, farm production for small holder farmers is not generating surplus to produce a reliable source of income (NISR, 2012). Co-operatives are being marketed by the government as avenues for assisting smallholder farmers to improve their income levels by providing them with appropriate technology and services. They are expected to produce increased yields of good quality maize which they would sell for profit and benefit from improved income. The NISR report indicates that production and income levels are low for the smallholder farmers, and about half of the population in Burera district who are mostly small scale maize producers are living under the national poverty line (Deptford and Hall, 2011).

1.3 Problem Statement

The PHHS-TF is concerned about the findings of the NISR report. As an organisation investing in agricultural inputs and services meant to increase maize production and income levels which are accessed by smallholder farmers through cooperatives, the PHHS-TF would like to investigate the contribution being made by the cooperatives to the smallholder farmers' income since they are directly responsible for implementing the services.

1.4 Justification of the study

Maize smallholder farmers in COAMV Cooperative are still experiencing low income for their household sustenance. Despite the training on post-harvest technologies, access to agricultural inputs and services offered through COAMV meant to improve production and income level, their agricultural production is still low and the subsequent household income levels are low. This calls for the need to conduct research assessing activities and services of COAMV Cooperative to agricultural production of maize farmers and the subsequent income obtained from sale of surplus maize for household consumption.

1.5 Objective of the research

The purpose of the research is to assess the contribution made by COAMV cooperative to household income of smallholder farmers accessing its services.

1.6 Research question

What contributions has COAMV Cooperative made towards small holder farmers income ?

Sub-questions:

- What are the selection criteria used by COAMV cooperative members for accessing its services?
- What are the challenges faced by members of COAMV cooperative in implementing activities related to services offered by the cooperative?
- What are the influences on the quality and quantity of the maize produced by the smallholder farmers who are members of COAMV cooperative?
- What are the profits earned by smallholder farmers in relation to the income generated from selling their maize produce?
- How do farmers invest the income generated from the selling their maize produce?

1.7 Definition of Concepts

Contribution: It is defined as the part played by the co-operative in bringing about results that help smallholder farmers to advance.

Cooperative: It is a business enterprise that seeks to strike a balance between pursuing profit and meeting the needs and interests of members and their communities. Cooperatives not only provide members with economic opportunities, but also offer them a wide range of services and opportunities. Agricultural cooperative facilitate smallholder farmers' access to natural resources such as land and water, information, communication and knowledge markets, food and productive assets such as seeds and tools, policy- and decision-making (FAO,2012).

Household: a social group which resides in the same place, shares the same meals, and makes joint or coordinated decisions over resource allocations and income pooling (Ellis, 2000). In Rwandan context, the household is defined as a group of people living in a given home at a particular time on permanent basis i.e. which share the same roof, the same source of income, the same basic needs such as access to the same land and livestock, share the same expenditures to sustain their livelihoods (Mckay and Greenwell, 2007).

Income: Barret and Reardon (2000) in their study of income diversification among African agriculturalists classify income into three sources. The first one is non-farm income which

refers to income obtained from activities outside the agricultural sector. The second one is on-farm income which refers to income obtained from agricultural activities done on the farmer's own property. The third one is off-farm income which refers to income obtained from agricultural activities that are done away from the farmer's own property. For the purposes of this research, using Barret and Reardon's classification (2000), the concept of income in this study refers to income obtained from on-farm and off-farm activities.

Household income: Household income is the combined income of all people sharing a particular household or a place of residence. It includes every form of income such as salaries and wages, monetary income from agricultural and livestock-raising activities, farm/non-farm wage activities, non-agricultural self-employed activities and transfers (NISR, 2012).

Smallholder farmers: are defined in various ways depending on the context, country and even ecological zones. Often the term 'smallholder' is interchangeably used with 'small scale', resource poor and sometimes 'peasant farmer'. In general terms smallholder only refers to their limited resource endowment relative to the other farmers in the sector. Smallholder farmers are also defined those owning small based plots of land on which they grow subsistence crops and one or two cash crop relying almost exclusively on family labour (Department of Agriculture Forestry and Fisheries, 2012). In Rwanda, smallholder farmers are those cultivating pieces of land between 0.3-0.9 hectares (NISR, 2012).

1.8 Conceptual framework

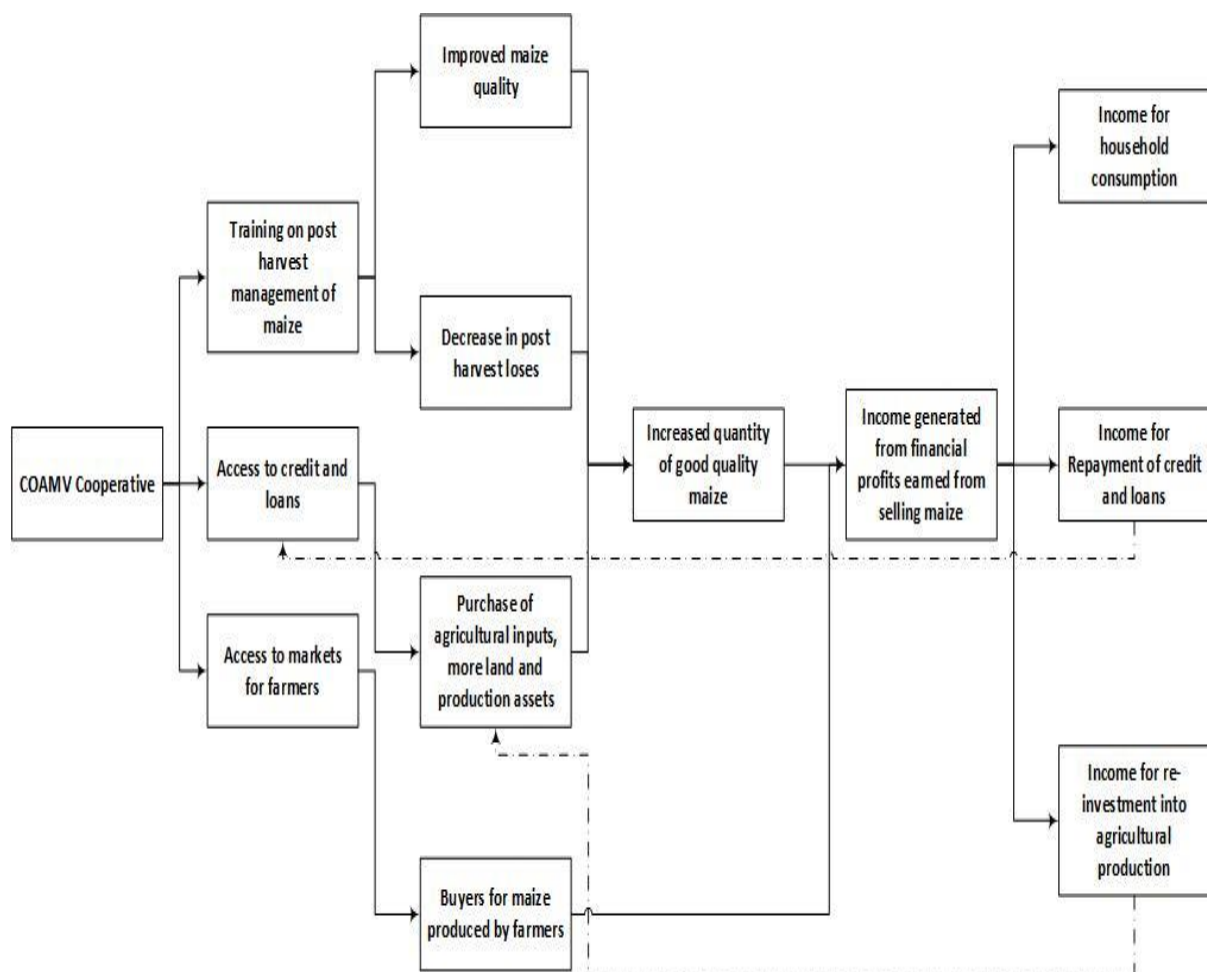


Figure 1. Conceptual Framework

Chapter two: Review of Literature

2.1 The meaning of the term ‘cooperative’

The Food and Agricultural Organisation (FAO, 2012) defines a cooperative as “*an autonomous association of women and men, who unite voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise*”. The aim of establishing a cooperative is to pursue profits whilst at the same time addressing the needs and interests of the members. Through cooperatives, members are also able to access services, economic opportunities and other non-economic opportunities. According to FAO, the cooperative model is found in different sectors that include agriculture, marketing and financial services and housing (FAO, 2012).

2.2 Agricultural cooperative

Agriculture is a broad term that refers to farming, forestry, fisheries and livestock (FAO, 2012). Agriculture is considered the main source of employment and income in rural areas and agricultural cooperatives play an important role in supporting small agricultural producers and marginalised groups. The benefits of agricultural cooperatives include members being empowered economically and socially, and also the creation of sustainable rural employment through business models resilient to economic and environmental shocks. Small agricultural producers are able to benefit in terms of opportunities and services that include access to markets, information, technologies, credit training and warehouses. Members are also able to participate in decision making processes at all levels and able to negotiate better terms for engagement in contract farming and lower prices for agricultural inputs such as fertilizer, seeds and equipment. As a result, smallholder producers secure their livelihoods whilst they play a greater role in meeting demand for food in local, national and international markets thereby contributing to poverty alleviation, food security and eradication of hunger (FAO, 2012).

According to Chambo (2009) agricultural cooperatives have impacted in the development of rural area in terms of availability and access to amenities that improve the basic conditions of life for rural small farmers. The cooperative contribute to the employment creation, rural markets development, enhancement of rural incomes and the improvement of access to social services. Farmers produce crops and marketed by co-operatives. Chambo (2009) also notes that agricultural cooperatives maintain higher levels of income and make small farmers able to construct houses, send their children to school and provide health insurance to sustain rural livelihoods.

2.2.1 Agricultural cooperatives in Rwanda

According to the Government of Rwanda (2013), agricultural co-operatives play an important role to sustainable food security in Rwanda. They encourage dependence on local productivity rather than relying on imported agricultural products. The government believes that through agricultural cooperatives, the living standards of the farmers have improved through profitable markets that where they sell their products. The formation of agricultural cooperatives in Rwanda is one of the important policies that have been put in place by the Ministry of Agriculture in an effort to address the food challenge in the country whilst improving the living standards of the members of cooperatives. The Ministry of Agriculture initially found it necessary to develop a policy that encourages the formation of agricultural cooperatives because farmers faced numerous challenges which include heavy rains and drought that destroy their crops and low productivity as a result of infertile soils. Through cooperatives, the government believes that farmers can access inputs such as fertilizers on loans from the cooperatives, which is paid back after harvest (Government of Rwanda, 2013).

2.2.2 The formation and diversity of Agricultural cooperatives in Rwanda

Agricultural cooperative in Rwanda are not homogenous entities. There are producer cooperatives, marketing cooperatives, large and small cooperatives. The way in which cooperatives are formed and organised is not similar for all agricultural cooperatives. According to Huggins (2013), there are cooperatives that are formed voluntarily by farmers themselves who come together as a result of common interest, and such cooperatives have the advantage of securing good prices for the produce of their members.

The other type of agricultural cooperatives and the common ones in Rwanda are those formed by local authorities. In these types of cooperatives, farmers are enticed to join the cooperative, not necessarily as a result of volunteering but attempts are made to encourage them to be part of the cooperatives. Huggins (2013) notes that the major challenge in these types of cooperatives is that the local elite who are associated with government authorities are usually the ones who hold administrative posts within cooperatives. As a result, small scale farmers who are supposed to be the primary group in the structure of the cooperatives are only invited to join an already formed cooperative, not necessarily based on their main interests.

Huggins (2013) also notes that the disadvantage of cooperative formed by the local authorities in Rwanda is that farmers are forced to share their financial resources with people they do not know or trust due to pressure imposed on them to form cooperatives by the local authorities. Also, such agricultural cooperatives are appointed by local authorities as the only state sanctioned purchasers of particular agricultural commodities in local zones, and farmers who attempt to sell their produce outside the cooperative system are made to pay fines.

On the other hand, the advantages of agricultural cooperatives formed by the state are that they are the cost effective way to bring farmers together. This makes it possible for the state to bring labour and land under the Crop Intensification Programme (CIP) so as to easily negotiate contracts with agribusiness (Huggins, 2013). The government further encourages these types of cooperatives to ensure state control over crop production. The advantages from the state's perspective are that the requirement of capital investment from farmers facilitates the commercialization of agricultural production. Since such cooperatives would be producing regular reports on membership, activities and capital availability, this makes it convenient for the state to monitor and analyse the developments within agricultural cooperatives.

2.2.3 Conditions of becoming a cooperative member in Rwanda

Being a member of a cooperative in Rwanda is voluntary and open to any person, in accordance with the seven international cooperatives principles. As a result of the lower operational cost and initial capital requirement in a cooperative, more people can afford to become members of cooperative.

Article 29 of the law No. 50/2007 of 18/09/2007 published in the government's Official Gazette No. 23 of 01.12.2007, gives guidelines on creation, organization and functioning of Cooperatives in Rwanda. The guidelines state that in order for a person to be a member of a Cooperative Organization, he or she shall be at least sixteen (16) years old, not participate directly or indirectly in any activity competing with the Cooperative Organization for which he or she is a member, have subscribed and paid up his or her shares in accordance with the by-laws in order to constitute the share capital, be committed to work thoroughly with the Cooperative Organization in all or part of the operations as provided for in its by-laws. The individual must apply for membership and be admitted by the General Assembly. No person shall be allowed to be a member of a Cooperative Organization in case his or her contribution to the share capital and his or her activities in the Cooperative Organization are different from those of other members (RCA, 2013).

2.2.4 Smallholder farmers and agricultural cooperatives in Rwanda

The World Food Programme (WFP, 2011) noted that the aim of agricultural cooperatives in Rwanda is to boost agricultural production and improve the income of smallholder farmers through developing the markets for their produce. Smallholder farmers through agricultural cooperatives are provided with training on production and marketing. The cooperatives benefit from the partnership they have with international agricultural agencies such as the World Food Programme (WFP) who also help improve the organisational capacity of selected farmer cooperatives by providing training to smallholder farmers and those responsible for running the cooperatives. The partnering agencies such as the WFP also provide the market for the smallholder farmers produce.

According to the WFP (2011), through cooperatives, smallholder farmer's access to storage facilities is improved, and they also benefit in terms of training on post-harvest handling and storage. As a result, the smallholder farmers would be able to respond to improved market opportunities which provide them with an incentive to increase their production. The idea of international agencies and other agricultural organisations to work with smallholder farmer's cooperatives in Rwanda results in a catalysing effect of increasing farmers access to inputs such as seeds, fertilizers and the training of farmers on how to handle their produce after harvest through drying, sorting and correctly storing it.

The partnering organisations and agencies such as the WFP have also established community warehouses at cooperative level. These warehouses also serve as trade centres for cooperatives, which are connected to the national grain reserves as part of the broader system of market infrastructure. By working with the international agricultural agencies and local agricultural organisations, the smallholder farmers' cooperatives productive and marketing capacities are improved together with their access to suitable financial services. Their negotiating position with traders is strengthened thereby integrating smallholder farmers into local and regional markets (WFP, 2011).

2.3 Land holdings and crop production

In Rwanda the total arable land is about 1.4 million hectares. Land is one of the major inputs in agricultural production. Given a growing population combined with strong reliance on agriculture, land is one of the scarcest resources in Rwanda. Households are classified according to land cultivated into the following categories: very small cultivators (under 0.3 ha), small cultivators (0.3 to 0.9 ha), medium cultivators (0.9 to 3 ha) and large cultivators (more than 3 ha). The average size of land cultivated per household is 0.39 ha. Approximately 91% of households cultivate under 0.9 ha of land. The Food and Agriculture Organisation estimates that on average a Rwandan household requires at least 0.9 ha to conduct sustainable agriculture (NISR, 2012).

Between 2010 and 2011, agricultural production in Burera increased from 2,867 tons to 24,767 tons. Agricultural production in the district is moving away from traditional methods to prioritizing single crops and consolidating land, both to increase access to inputs and markets. Although Irish potatoes are the primary cash crop, maize is becoming the focus crop in the Northern Province (Deptford and Hall, 2011).

2.4 Household characteristics of Burera district

The average size of household in Burera District is 5 persons. According to Deptford and Hall (2011) households in Burera district are categorised into 4 groups which are; very poor, poor, middle, and better off. Very poor households are a rural work-force, mainly employed in local agriculture, creating or maintaining hillside terraces, building houses and undertaking maintenance work in the seasons when there is little work in farming. They have access to very little land and mostly consume what little food they grow. They do not own livestock and only have basic assets such as a hoe and an axe. Poor households are also dependent upon wages for income. They own more land than the very poor and are able to consume and sell their crops and livestock.

The middle wealth group earn a large amount of their income from employment, however as they have more land and assets they are able to own large livestock such as a cow, which generates income by selling milk. The Better off household earn a living as farmers by selling crops and livestock, they provide employment to the poor and very poor by renting their land and they carry out petty trade.

Table 1. Household characteristics in Burera District

Group	% of population	Typical Household size	Land area Cultivated	Livestock holding	Assets	Total annual income (Rwf)
Very poor	16	6	500 m ²	0	Hoe, axe, machete	428,000
Poor	41	7	1,658 m ²	1 sheep, 1 hen	Hoe, axe, machete, radio	478,000
Middle	32	6	3,266 m ²	1 cow, 1 sheep	Hoe, axe, machete, bicycle, radio, mobile phone	706, 000
Better off	11	6	5,349 m ²	1-2 cows, 1-2 sheep	Hoe, axe, machete, bicycle, radio, mobile phone, timber tree	991, 000

Source: Deptford and Hall, 2011

2.5 Poverty analysis in the district

Currently, it is projected that 40-45 % of the population in Burera district falls below the national poverty line. The main causes of poverty in the district are lack of access to land and livestock, and ownership of assets (Deptford and Hall, 2011). Although the district has a number of natural and human capitals, these are under developed and underutilized. Lack of infrastructure leads to insufficient access to market. To mention but a few, roads are bad and majority of roads not accessible during the rainy season (NISR, 2012).

2.6 Production Technology in the Burera District

The main tool used in cultivation is the traditional hoe. Simple tools like grinding stones, pestles and frying pans are used to process the crops produced. The major crops cultivated and processed in the district include maize, sweet and Irish potatoes, beans, wheat and millet. Manual labour constitutes a high percentage in the agro-processing activities of the district. Production units in the Burera district are family owned and skills are passed down through the parents.

2.7 COAMV cooperative in Burera district

According to the African Development Foundation (2013), the Cooperative des Agriculteurs de Maïs Dans la Zone des Volcans (COAMV) started 2003 and got a legal personality in 2006. It is a registered cooperative, located in Kidakama Cell, Gahunga Sector, Burera District, in the Northern Province of Rwanda. COAMV operates in partnership with other cooperatives and 315 farmers associations which together have a membership of 12,247 farmers (5250 women and 6,997 men). The cooperative provides farm inputs (mainly seeds and fertilizers) and extension services to the farmers associations which in turn grow and sell maize to cooperative. COAMV grows and also buys maize from farmers associations and processes it into flour which is sold on the local market.

USAID (2013) highlights that COAMV is a cooperative buyer that aggregates commodities and processes maize flour for markets throughout Rwanda. Cooperative members are benefitting from assistance provided by USAID's Post Harvest Handling and Storage (PHHS) project, including post-harvest management trainings and linkages to private sector buyers and the World Food Program (WFP). Among COAMV's network of cooperatives, 3 690 farmers are being trained in post-harvest techniques. Assistance to COAMV is also complemented by a previous grant from the USAID Market Linkages Initiative to improve COAMV's storage facilities. COAMV receive trainings from PHHS TF in collaboration with the WFP to address constraints in post-harvest management of maize in order to improve the quality of maize being produced, access to new markets, decreases in post-harvest losses and increased access to credit.

2.7.1 Organizational aspects of COAMV

COAMV started with a share capital of FRW 1,120,000 which has grown to FRW 95,956,973 by the end of 2009. In conformity to the existing Cooperative law in Rwanda, all members hold equal shares and presently each holds 6.25% of the share capital. It noted that the actual share capital has been increasing over time by accumulated profits and reserves.

The statutory organogram of COAMV are the General Assembly which is composed of all the members of COAMV; the Board of Directors which is composed of 6 members elected by the General Assembly; and the Supervisory Committee (Internal Auditors) composed of 3 members and elected by the General Assembly (See annex 4),(COAMV, 2010).

2.7.2 Sources of income for the COAMV and its members

Farmers of COAMV in Burera district do not stick to one activity to get income. They are involved in different activities to improve their livelihood. These activities included on-farm; non-farm and off-farm activities such as sale of livestock, sale of crops (maize, wheat, beans and potatoes) and others are employed by COAMV. They also get income from sale of maize grain milled residue as animal feed. The management of maize grains and maize milling factory is a source of income as well for the cooperative. A recent activity for many farmers is the production of improved maize grains which generates 20% of total income for the cooperative (COAMV, 2010). The cooperative also earns income from training other cooperatives around the country. Other than this, some of members have remittance as another source of household income.

2.7.3 Activities of COAMV Cooperative

After its creation, COAMV focused its activities on production and marketing of maize flour and maize derivatives, multiplication of improved seeds and marketing of chemical fertilizer (DAP and Urea) and training on postharvest techniques.

Production and marketing of maize and its by-products constitute the main activity of COAMV cooperative and generated about 20% of the total income as opposed to 80% income generated by the remaining activities of seed multiplication and sale of chemical fertilizer in the year 2009.

2.7.4 Description of COAMV products

Maize flour and maize residue produced by COAMV:

The maize flour and other maize by products are obtained by milling the maize grains and results into three categories of marketable finished products. These are distinguished from one another on the basis of quality as shown in the table below:

Table 2. Characteristic of the maize flour and other maize by products

Quality	Product	Use
No.1	Refined Grade 1 flour	Used for human consumption as white Ugali commonly known as 'Akawunga'. It is very nutritious
No.2	Semi-refined Grade 2 flour	Very nutritious and usually recommended for porridge for children
No.3	Residues	Used in the production of animal feed

Source : COAMV,2010

Improved Seeds:

For seed multiplication, COAMV started the activity of seed multiplication in 2006 and started with 2 kinds of seeds namely maize and Irish potato. In 2008, organizations who are financiers of the COAMV activities requested the latter to introduce multiplication of a third seed of beans. The three seeds have well adapted to the volcanic region where COAMV works and the seed multiplication trend is increasing year after year. Apart from the changing climatic conditions and disease which affect the crops, and influence the level of production, COAMV's main challenge in seed multiplication is insufficient land to do extension of multiplication of the three seeds. Effects of climatic change are compensated by availability of a conducive climate in the region throughout the year, while effects of disease are combatted by appropriate application of pesticides. Here in the table below is a performance trend of seed multiplication for the period 2007 to 2009.

Table 3. Trend of multiplication (tons) of improved seeds by COAMV from 2007 to 2009

Seeds	Lear (s)			% of income	COAMV	% of demand	national
	2007	2008	2009	2009		2009	
Maize	26,7	47	59	11 %		4,7 %	
Potatoes	32	67	173	24 %		0,2 %	
Beans	-	41	36	8 %		1,3 %	

Source : COAMV, 2010

Fertilizer:

COAMV also has the activity of marketing and selling chemical fertilizer. COAMV engaged in this activity to contribute to the availability of agricultural inputs, especially DAP (Di-amino Phosphate) and Urea which are widely used in COAMV geographical zone. Sales from chemical fertilizer mentioned represented 38% of the total sales of COAMV in 2009 selling 200 tons of DAP and 100 tons of Urea. The table below summarizes the production of each product.

Table 4. Total production for each product

Product/year	2008	2009	2010	2011	2012
Maize flour No. 1	568,664	613,130	662,043	715,848	775,033
Maize flour No. 2	73,376	79,114	85,425	92,367	100,004
Maize residues	247,644	267,008	288,309	311,740	337,514
Potatoes seeds	250,000	250,000	250,000	250,000	250,000
Beans	70,000	70,000	70,000	70,000	70,000
Maize	110,000	110,000	110,000	110,000	110,000
DAP	220,000	242,000	266,200	292,820	322,102
Urea	110,000	121,000	133,100	146,410	161,051

Source: COAMV, 2010

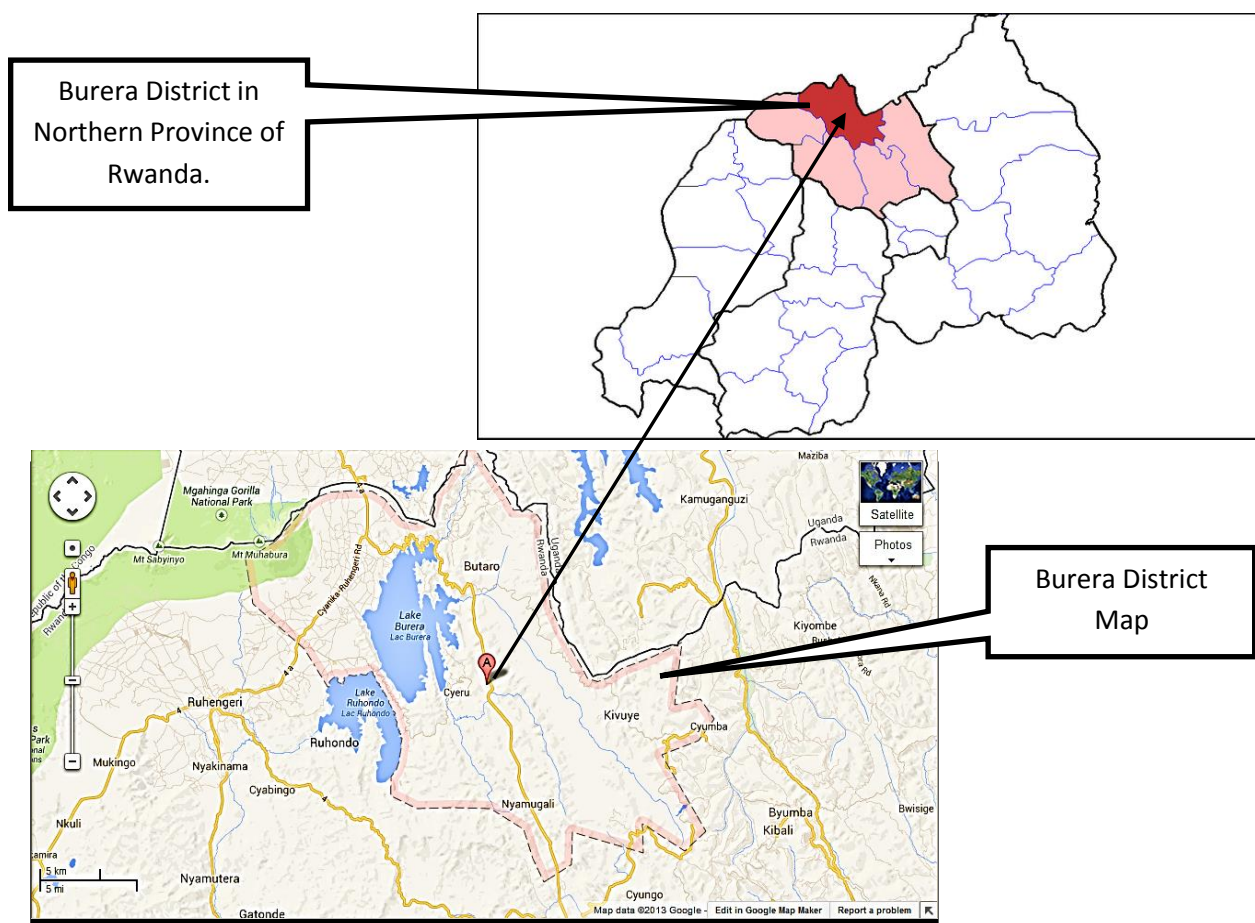
Trainings:

COAMV also assists farmers in form of trainings. The topics of training sessions are summarised below as follows; Techniques of maize production, Purchasing and reselling of agricultural products, Marketing skills, Post-harvest storage techniques, Techniques of multiplication for improved seeds production and Safety use of pesticides (COAMV, 2010).

Chapter three: Research Methodology

3.1 Study area

According to the Government of Rwanda (2013) Burera District is one of the 5 districts of the Northern Province of Rwanda. It has approximately 570 villages and 340 000 inhabitants. The landscape is characterised by steep sloping hills connected either by valleys or flooded marshes. The climate of the district is generally wet, characterised by two dry seasons and two wet seasons every year. The dominant industry of usual main jobs in Burera is agriculture, with approximately 80% of the population aged 16 years and above involved in it. Agriculture provides the main source of income with approximately 45% of households having it as their main source of income (NISR, 2012). The socio-economic situation of this sub-region is determined by the high population density caused by a high population growth rate. As a result, the household land properties are small with significant differences between better off and worse off farmers. Most rural households live off their land that is primarily used for subsistence cropping, and the small surpluses are sent to the local market. Cash cropping is seldom practiced due to lack of land, and among worse off households, farm production is not enough to fully meet the needs of the family (FAO, 2012).



Source: Google Maps 2013

Figure 2. Map of Burera District, Northern Province in Rwanda

3.2 Research design

The study used a qualitative approach through desk study and field study. A checklist with guiding questions was used to obtain data from the respondents. The data was collected through a case study method in order to obtain in-depth knowledge on the research problem.

3.3 Desk study

This was the first stage of research and it involved the collection and use of secondary information. Basically it was done through literature study.

3.3.1 Literature study

The information was collected using mainly electronic search to access the digital library of WUR, as well as other internet sources, books, journals, reports and unpublished documents from the research area. The use of available documents was very important to get an overview of the case. This was done to find relevant information on the agricultural cooperative in Rwanda, formation and development of agricultural cooperative and agricultural practices in the study area. Furthermore, the desk study was done to get the literature review and background information overview of the income of smallholders farmers.

3.4 Fieldwork

The field work data collection was second step of the research. It involved gathering primary information and used open ended questions shown in annex 1, 2 and 3.



Figure 3. Researcher interviewing a maize processor in COAMV Cooperative

Individual interviews and one focus group discussion were conducted as shown in figure 3 and figure 4. Individual interviews were conducted with 20 maize farmers as members and five representatives of COAMV cooperative to obtain in depth information from the respondents and the focus group discussion was conducted to triangulate information from individual interviews and also obtain any other relevant information left out in individual interviews.



Figure 4. Researcher having a focus group discussion at the cooperative site

3.4.1 Sample selection

A total of 20 maize processors that accessed services of COAMV were selected. Five representatives from the cooperative were also interviewed individually. These interviews were done to triangulate information from the cooperative and the beneficiaries of COAMV.

3.4.2 Interviews with key informants

Table 5. Summary of respondents

No of respondents	Category of respondents	Method of collecting data
20	Beneficiaries of COAMV	Individual interview
10	Beneficiaries of COAMV (Respondents from individual interviews)	Focus group discussion
5	Representatives of COAMV	Individual interview

3.5 Analysis of Results

The data analysis process is going to be guided by the conceptual framework design in order to understand the factors that contribute to the agricultural production of maize by the farmers, the subsequent income obtained and its investment into the household. The following table provides an outline on data analysis:

Table 6. The components of data analysis

Category for data analysis	Sub-category for data analysis
Beneficiary selection	<ul style="list-style-type: none">• Criteria and beneficiary involvement• Demographic background
Services and activities	<ul style="list-style-type: none">• Credit and loans• Agricultural input and training• Marketing of produce
Challenges and possible solutions	<ul style="list-style-type: none">• Both farmers and cooperative
Influences on quality and quantity of maize	<ul style="list-style-type: none">• Training on postharvest techniques• Access to improved agricultural inputs
Investment of income	<ul style="list-style-type: none">• Agricultural production and loans• Household level

3.6 Limitation of the research

The researcher had initial difficulties in securing the cooperation of smallholder farmers. Some highlighted that they were too busy to participate in the interviews and in order to make up for their lost time they needed to be paid a small token of appreciation. As a result, the researcher had to pay them before interviews were conducted.

3.7 Ethical issues

Participants were sensitized and made to understand why they were selected for the interviews. The main reason for the research was explained to the participants and they were asked if they were willing to voluntarily participate in the activity before interviews. The participants confirmed their participation through verbal consent, and were assured that information obtained from them was strictly for academic purposes and would not be used against them or to identify any of them.

Chapter four: Results

4.1 Demographic information of respondents

4.1.1 Membership of respondents

The table below shows that there are more members who have 6 – 10 years membership with COAMV cooperative compared to those who have less than 5 years.

Table 7. Years spent by respondents as members of the COAMV cooperative

Years	Members from cooperatives	Members from associations
1-5	1	3
6-10	9	7
11-15	0	0

4.2 Criteria for accessing cooperatives services

4.2.1 Criteria defined by the cooperative for selection

The criteria for selecting beneficiaries is set by the government and given to the cooperative as a set standard. The cooperative uses the criteria as per government directive. As a result, the following represents the criteria that COAMV cooperative uses in identifying beneficiaries or its services.

For a person to be a member of a COAMV Cooperative he/she should:

- Be at least sixteen (16) years old
- Not participate directly or indirectly in any activity competing with the COAMV activities
- Have subscribed and paid up shares of 6.25% of share capital
- Be committed to work thoroughly with the COAMV in all or part of the operations.
- The individual must apply for membership and be admitted by the General Assembly.

4.2.2 Beneficiary involvement in developing criteria and selection

Beneficiaries are involved in identifying and recommending potential members of the cooperative. If they want to start another activity or to buy materials, they have to contact the General Assembly.

4.3 Services and activities offered by COAMV relevant to maize production

The 20 respondents interviewed identified five services and activities offered by the cooperative to be significant to their maize production. Figure one illustrates the responses as provided by the maize farmers.

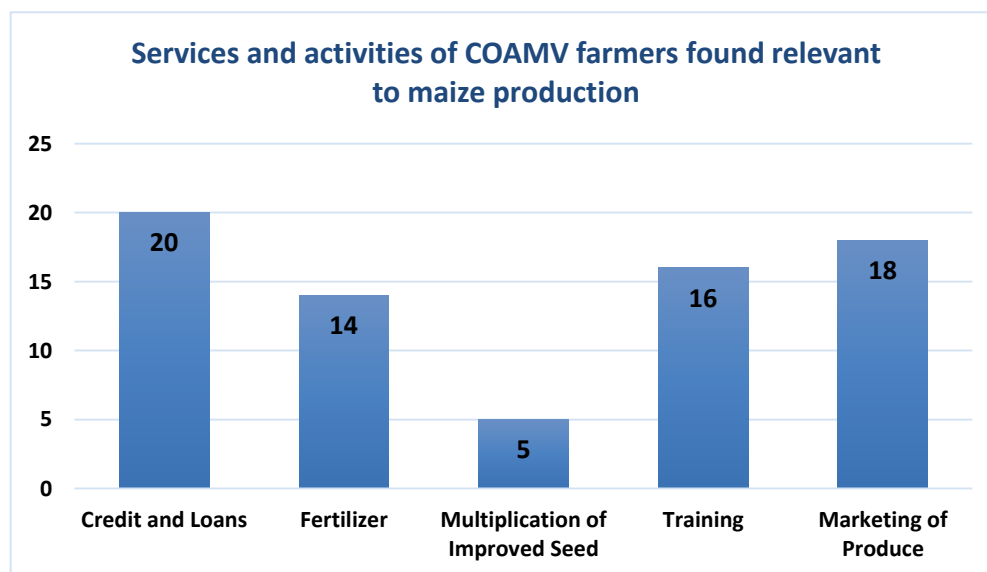


Figure 5. COAMV Services identified by farmers as relevant to their maize production

Results from figure 5 show that access to credit and loans is the most relevant service offered by the cooperative, followed by marketing of produce. Provision of fertilizer and training services offered by the cooperative were also found by the respondents to be significantly important. Only five respondents identified the multiplication of improved seed as relevant to their maize production.

4.4 Influence on quality and quantity of maize production

All respondents highlighted that the training they received in post-harvest technologies has influenced their maize production. The losses have been reduced and this training is contained in all stages of maize production from harvesting to storage. See annex 9. In addition to this, they highlighted that the use of improved agricultural inputs (seeds and fertilizers) had a positive influence on quality and quantity of their produce.

4.4.1 Quantity of maize produced before and after joining Cooperative

The farmers were questioned on the quantities of maize they produced before joining the cooperative and the quantities they are now producing after joining the cooperative. This was done to assess the contribution made by the cooperative in improving maize production for individual farmers.

Table 8. Maize production before and after joining the cooperative

Respondent	Maize before cooperative (kg/acre)	Maize after cooperative (kg/acre)
1	475	1000
2	850	2100
3	70	200
4	400	1050
5	50	100
6	50	100
7	800	2000
8	150	300
9	210	500
10	100	165
11	200	300
12	200	350
13	340	600
14	480	900
15	100	300
16	300	800
17	120	300
18	80	200
19	350	600
20	450	1000

Table 8 shows the maize quantities produced by farmers before joining the cooperative and after joining the cooperative. The observation from the statistics show an increase in the quantities produced per member, although the quantities vary as a result of independent factors such as access to loans or credit and use of agricultural input that affect individual farmers.

The figure shows that all farmers had an increase in their maize production. The average maize production per acre for all respondents before joining the cooperative was approximately 289 kg per acre. After joining the cooperative the average maize size increased to approximately 643kg per acre. This is reflected in figure 6 below;

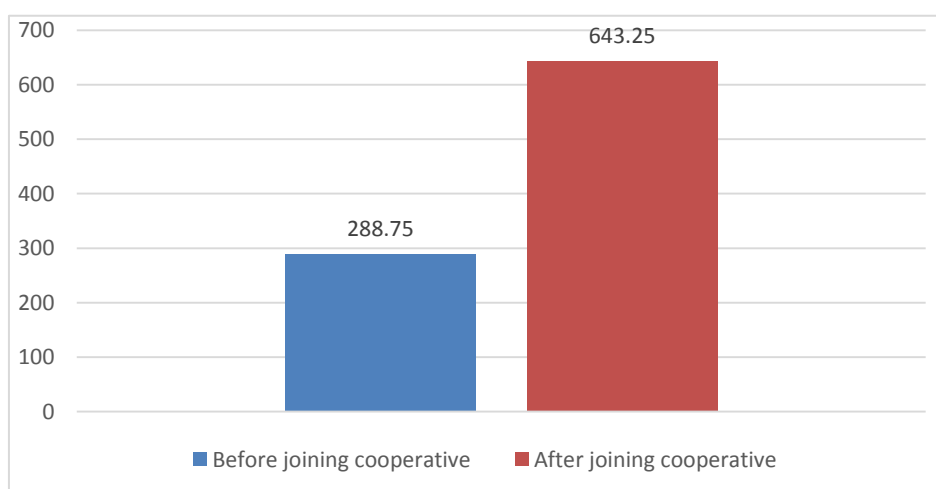


Figure 6. Average of maize production before and after joining the cooperative

The graph shows that before joining the cooperative, farmers used to produce less compared to after joining the cooperative. According to cooperative members, the increase is a result of improved farming methods and technologies offered by the cooperative.

4.4.2 Credits and loans availed to farmers and inputs purchased

All 20 respondents indicated that before joining the cooperative they used to experience difficulties in obtaining loans and credits for maize production. But now, because of working with cooperative, they have access to seeds and fertilizers as a part of loans which they have to pay after harvesting. The cooperative enables them to afford yield raising inputs year after year. It also enables members to obtain loan and credits from banks and financial institutions once cooperative proves that they are its members.

The interviews revealed that out of a total of 20 respondents;

- 10 respondents are accessing the revolving fund, seeds and fertilizer for their maize production.
- 5 respondents are accessing seeds and fertilizer for their maize production.
- 2 respondents are accessing the revolving fund and seeds for maize production.
- 3 respondents are accessing seeds only for their maize production.

For a more detailed schedule on the responses obtained during interviews, see Annex 7.

4.4.3 Farmers' suggestions to improve cooperative services

- Keep on improving relationship/collaboration of COAMV and farmers in order to continue working together: 2 respondents suggested that the relationship of COAMV with members should not be limited with beneficiaries in the district.
- To obtain other fund to rise the working capacity : 18 respondents indicated that the COAMV cooperative services has been limited by financial constraints, they suggest that if their cooperative find the financial support, their services will be improved

4.5 Challenges in implementing activities offered by the cooperative

The table below shows the challenges faced by members of COAMV and the consequences to their agricultural production. The majority of respondents highlighted the main problem as the delay in payment. They attributed the problem to the administration of the cooperative and they needed it to be addressed to avoid future inconveniences in agricultural production.

Table 9. COAMV services that farmers are experiencing challenges

Services	Number of Respondents	Comments
Agricultural inputs provision	2	Respondents indicated that the provision of seeds by the cooperative is not carried out timeously. This is noted to affect timing in their maize production and to a lesser extent poses an inconvenience.
Provision of loans and credits	7	Respondents noted that the amounts provided to group of farmers through the revolving fund is not enough to adequately run the projects that generate money through the fund. There is a need to increase the amount so that members can fully realize the benefits of the fund.
Bad management of funds	5	Some respondents believed that the cooperative to some extent is not properly managing its funds. They felt that this has had some negative repercussions on service delivery by the cooperative which ends up affecting the farmers meant to benefit from its services. As a result, not only does the cooperative suffer losses but also the farmers who are meant to benefit from the cooperative also suffer losses.
Technical support	6	The respondents noted that the cooperative has one Agronomist who is responsible for demonstrating to the farmers' methods of applying improved seeds and fertilizers. This professional is not always readily accessible to farmers all the time and there seem to be a challenge of shortage of technical support as a result of having one Agronomist to serve all the beneficiaries of the services offered by the cooperative. As a result there is a potential of practicing inappropriate maize production methods.
Payment of maize suppliers	20	There is a tendency by the cooperative to delay meeting its obligations to the farmers. The respondents highlighted that the cooperative usually delays processing payments for the maize produce that would have been delivered. Since the cooperative also provides a ready market for the maize farmers, the expectation is to be immediately paid after delivery of produce, but payments usually take longer than expected, therefore causing delays in any future plans that the farmers would have put in place.

4.5.1 Consequences challenges to farmers on agricultural production

- Delay in inputs distribution: 2 out of 20 respondents indicated that this problem strongly affects their production because when they delay in obtaining agricultural inputs, this leads to delay in planting, and their plants will be attacked by rain and pest as results in decreased produce.

- Provision of loans and credits: 7 out of 20 respondents indicated that unavailability of loans and credits on time will also lead to delay in buying agricultural inputs or pay workers. Both challenges affect farmers and lead to decrease in production.

- 6 out of 20 out of respondents indicated that one agronomist cannot reach all beneficiaries as they need him, some have to look for other help, and others do not rely on time, they end up plant maize without the supervision of agronomist.

- 5 out of 20 of respondents indicated that the improper administration of funds is the main cause of the problems
- All 20 respondents indicated that delay in payment of the money from the maize supplied to the cooperative affects their planning in agriculture.

4.5.2 Possible solution to challenges as perceived by farmers

- Respondents suggested solutions such as the cooperative should make an effort to have enough inputs in storage so that they might be able to provide them on time. Even though they might not be familiar with the internal logistics in securing the required stock, the authorities should make an effort that they are adequately stocked so that when the time to distribute the inputs there will be no delays that will inconvenience any future plans.
- There were suggestions of also making an effort to secure more financial support for the cooperative as the respondents believe that the more financial support would lead to more benefits for them in terms of obtaining loans and savings on time. Currently the respondents indicated that the financial support being received is not adequate therefore needs to be improved.
- There is need to increase the number of Agronomists within the cooperative. The current single professional operating within the cooperative is not able to meet the demands of all members therefore by employing another specialist might help alleviate the pressure on the current Agronomist and might increase accessibility by farmers to the specialist services being offered.
- The respondents indicated that the cooperative must make an effort to process their payment on time. Even though they are not familiar with the administrative procedures involving payments to them, they highlighted that there is a need to improve the payment process so that they are not inconvenienced by having to wait to a later time found suitable by the cooperative to process the amounts.

4.5.3 Initiative of cooperative to address the challenges

The following are the possible solutions as indicated by the cooperative:

- The cooperative committee indicated that they are looking for funds from banks in order to raise their working capacity and build new storage facilities.
- There are initiatives being made by the cooperative related to capacity building of cooperative representatives on specific trainings related to maize production for farmers handling the production of maize. The idea is to always deliver training that is appropriate for the production of a specific crop such as maize and not offer general training that is expected to be applied to all types of crops.
- With reference to shortage of technical staff, the cooperative indicated that there are administrative procedures that need to be followed before recruiting another Agronomist. Whilst it is important to have the second specialist, the procedures of attracting and retaining such specialists are continuously proving to be a challenge. With such a background in context the cooperative is making effort to address the issue so that their operations and goals are not compromised.

4.6 Profits from income generated from maize production

4.6.1 Profits or losses incurred by maize farmers

The maize farmers interviewed all reported an increase in income from the sale of their maize. They highlighted that this increase is a result of application of improved maize production technologies received through COAMV.

In their calculations, farmers did not consider the labour spent in maize farming and they do not calculate the interest related to their activities. They value seeds and fertilizer as cost of investment. For members to know that they are making profits or losses, the farmers calculated their profits benefited from the sale of maize by applying the following simple formula:

PROFIT OR LOSS = AMOUNT RECEIVED FROM MAIZE SALES – TOTAL COST OF PRODUCING MAIZE

Although this is not a standardized formula officially being used by the cooperative, all the respondents when asked on whether they are making any profits or losses their responses were similar and in line with the above formula.

4.6.2 Involvement with cooperatives and its contribution to profit making

All 20 respondents indicated that they are presently receiving more profits compared to when they were not involved with the cooperative. Prior to the intervention they were not able to sell most of their produce because the amounts produced were not enough for home consumption. As a result, it was difficult to reserve any produce to sell at the market for there were immediate food needs at their respective homes. Another issue highlighted is the advantage of the cooperative providing a market for their produce where the cooperative also buys maize produce from the farmers, reducing more logistical and networking challenges if farmers were to go and sell produce on their own. The centralization of the buying centre by the cooperative has created an enabling environment for the farmers in terms of accessibility to market. The only concern farmers highlighted is the delay in processing payments, which usually acts as a drawback.

The training on post-harvest practices by COAMV has been noted to have improved the quality of maize produced, which is reflected by the increased income they receive. The responses from the farmers indicate that compared to when they were not involved with the cooperative, the current situation has improved. Indicators for the improved production highlighted by the farmers include increased quantity of maize produced, better colour and taste of the maize which has made their produce competitive.

4.7 Investment of maize income by farmers

4.7.1 Income invested in agricultural production

The respondents were not able to exactly calculate precisely how much they invested in agricultural production. Some respondents highlighted that after the sale of maize, they reserve part of the income for agricultural production to buy inputs for next season and others indicated that the part of their income is used to pay their workers involved for the farming activities. The idea that there is a possibility to pay workers, reserve part of the income for agricultural production for the next season indicates that they were able to generate surplus to continue activities for the next farming season.

4.7.2 Income invested in loan payment and credits

Before considering income as profits they first pay loan and credits. All respondents highlighted that the cooperative made it easier for them to repay their loans and credits. The process of repayment is that, when the farmers bring their maize for sale to the cooperative, the cooperative deducts the amount loaned to the farmer from the proceeds of the sale if the farmer agrees. Alternatively, if the farmer does not want to have the loan deducted from the sale the cooperative deducts from the maize grain the amount of kilograms equivalent to the amount loaned to the farmer. As a result, the respondents indicated that this method of repayment has provided them with an easier alternative to access loans and credit and made it possible for them to be able to repay in a more comfortable way.

4.7.3 Household benefits that come after joining the cooperative

All 20 respondents indicated that since joining the cooperative, their lives have changed in terms of benefits that their respective households have received. The benefits identified by the respondents are those that they managed to obtain as a result of being involved with COAMV cooperative. The respondents gave a list of benefits (See Annex 8) and for presentation purposes the following have been identified:

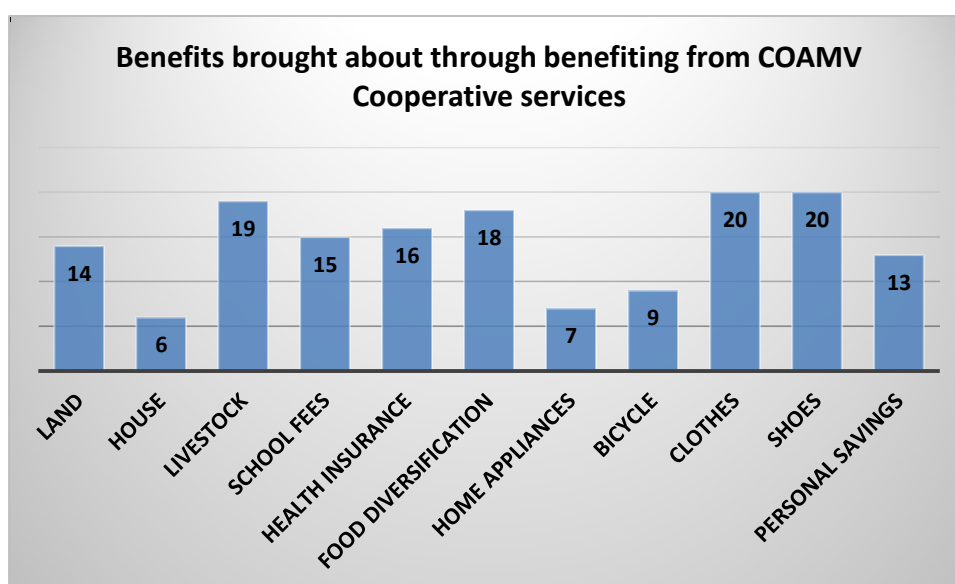


Figure 7. Benefits identified by maize farmers

The figure shows most of the respondents have improved benefits in terms of land, livestock, school fees, health insurance, food diversification clothes shoes and personal savings as a result of the services offered to them by COAMV cooperative in their maize production. The resultant household income from maize production has led them into realising the identified benefits.

4.8 Focus group discussion

The FGD was intended to collect qualitative data so that information gathered through the other data collection tools is strengthened. In doing so, guide for FGD on relevant issues and questions were prepared by the researcher with due consideration to the objective of the study and the roles of respondents in the process of operation. Each member was requested to respond accordingly and further explain any feeling in this regard. The participants of the FGD were members of COAMV cooperative and are involved in maize production. Every activity of cooperative has its own impact in contributing towards the raising of income.

- All respondents indicated that their production in maize has been increased in quantity and quality as a result of training on post-harvest technologies and use of improved agricultural inputs.
- Respondents also indicated that there was a considerable decrease in post-harvest losses due to the use of appropriate farming techniques. And they have insisted that when they follow all post harvesting stages from harvesting to storage as trained there is no doubt that they will acquire a high potential of buyers for their maize.
- They highlighted that COAMV is the potential buyer of their produce and they explained that the COAMV bought their produce at higher price when compared to the local markets.
- Selling Maize has been indicated as a considerable source of income, and followed by being employed by the cooperative. Members are employed as staff cooperative to carry out activities such as sorting, threshing and drying. Respondents explained that they used the income from sale of maize to pay loans and credits, and the remaining is used for household consumption and savings.
- Respondents mentioned that the delay in inputs provision and payment of suppliers occur many times.

According to the group discussion, successes are perceived as a result of the intervention such as economic support where access to credit helps them engage in other business than maize production. They have also improved their saving and some have managed to buy their own land and build houses.

Chapter five: Discussions

5.1 Demographic background

According to Deptford and Hall (2011) approximately 45% of the population in Burera district falls under the national poverty line and the causes are lack of land and livestock, including ownership of assets. In their categorisation of household characteristics, the very poor household in Burera are those who have very little access to land and consume the little food they grow. They do not own livestock and have only basic assets as a hoe and axe and cultivate 500m² of land. The poor household are those that are dependent on wages for income, own more land compared to the very poor and are able to consume and sell their produce crops and livestock. The poor cultivate about 1,700m² of land. The government of Rwanda classifies very small cultivators as those owning under 0,3 hectare of land (NISR, 2012), and according to Deptford and Hall (2011) these are very poor households. Small cultivators according to the government of Rwanda are those who cultivate between 0,3-0,9 hectare, and according to Deptford and Hall (2011) those are poor households. As a result, approximately half of the population in Burera district are range from the poor to very poor with all of them cultivating 0,3 hectare and less.

Since the cooperative serves small holder farmers in Burera district, who are small cultivators the implications are that approximately half the population of Burera district qualifies to be beneficiaries of COAMV cooperative. According to the African Development Foundation (2013), the COAMV Cooperative offer service to 12,247 maize farmers and According to the Government of Rwanda (2013), Burera District, where COAMV cooperative carried out its operations has 340 000 inhabitants of which with approximately 80% are involved in agriculture with approximately 45% of households having it as their main source of income (NISR, 2012). This can be concluded that the number of beneficiary is relatively small when compare to the total number of small farmers rely on agriculture as their source of income in Burera district.

Research findings indicate that out of 20 respondents interviewed, 16 of them have been benefiting from the cooperative for years between 6 and 10, and only 4 have been members for 5 years or less. This indicates the continued participation of farmers in the cooperative activities.

5.2 Criteria for accessing cooperatives services

5.2.1 Beneficiary selection

The findings show that the COAMV cooperative uses the criteria defined by the government to select members who are going to benefits from its services. The cooperative itself does not have the flexibility of modifying the criteria as it is defined in the constitution of Rwanda, the free modification are beyond the influence of the cooperative. This indicates that the beneficiaries of the services do not have any influence in defining the selection criteria based on their interests, but it is a government initiative in which they are required to participate. As a result this is in line with findings from a study by Huggins (2013) which highlights that farmers in Rwanda are enticed to join cooperatives that are formed by local authorities. Findings from the study also indicate that the farmers have be to be encouraged to join and motivated to participate in the cooperatives activities.

5.2.2 Beneficiary involvement

The selection criteria for beneficiary involvement are set out in the terms and conditions of the cooperative as advised by Rwanda cooperative Agency (RCA). The cooperative implements the criteria as per recommendation from the RCA, but also further involves the community that is farmers who are already members of a cooperative; to help identify potential members or future members of the cooperative.

The current cooperative members have to first conduct the identification process themselves and have to come up with a decision on whether the identified person needs to be recommended to the cooperative in order to benefit from its services. The reason for doing this exercise is because the cooperative members are the ones who know each other well in the community therefore they are better informants of the situation and conditions being faced by other farmers in comparison to its potential members. As a result, both the cooperative set criteria and recommendations from the cooperative members are considered before the new potential beneficiary is regarded as a member. These recommendations are finally forwarded to the General Assembly for final decision and confirmation.

The process itself appears to be a democratic process where there is involvement from both parties, that is, the cooperative and beneficiaries. As a result of farmers' involvement, they end up owning the development process which further encourages farmers to remain accessing the services being offered by the cooperative.

5.3 Services and activities influence the quality and quantity of maize

5.3.1 Credit and loans

One of the activities of COAMV is to provide loan and credit to members who are engaged in maize production and residing in the operation area of the cooperative. The loan/credit is served in terms of money/revolving fund or agricultural inputs.

Cooperative societies are important credit sources for farmers in the study area. They provide a wide variety of credits services, including input supply, grain marketing, and the supply of consumer goods to members at prices that compete with local traders. In the study area, financial limitation is one of the common problems of farmers. A farmer who has access to credit can overcome the farmers' financial constraints and can purchase various inputs required for his farm production. A farmer without cash and at the same time has no access to credit will find it very difficult to obtain improved agricultural inputs. Besides availability of credit, farmers' level of credit use also matters particularly in activities like maize production. Therefore access to credit through cooperative positively affects the maize production as results in increase their income.

Results from the study indicate that 80% the respondents have access to loans and credits in the form of revolving funds, seeds and fertilizers being offered by the cooperative. The farmers highlighted that the acquisition of loans and credits has been made possible for them and they have to pay back loans after harvesting. As a result of the form of the available loans and credits, the cooperative has made it easier for farmers to have access to yield raising inputs in the form of improved seeds and fertilizers for their maize production, enabling farmers to produce increased quantity of maize. The results indicated that farmers required two or more form of loans and credits in order to facilitate their maize production process. The reason is that some loans in the form of seed and fertilizer sometimes are distributed late to the farmers. If they have other forms of loans in place, could be in a position to cover the gap created by the delays. Therefore, it can be argued that COAMV has been able to effectively facilitate the maize farmers' needs in terms of access to loans and credits by providing them in forms of revolving fund and yield raising farming inputs.

5.3.2. Agricultural input and training

Findings in table 8 indicate an increase in quantity in maize production by farmers. The results indicated that prior to joining the cooperative; the farmers produced less quantity of maize. After joining the cooperative the total maize production increased by more than 50% compared to the initial production. The farmers attributed the increase to yield raising farming inputs made available by the cooperative. One of the reasons for reduced maize production before joining the cooperative is a result of improper farming practices by the farmers which led to post-harvest losses. The training on post-harvest losses reduction that the farmers received from the cooperative contributed in the reduction of post-harvest losses. Appropriate training in post-harvest handling and storage combined with yield raising inputs and access

to loans and credits such as revolving fund, have all contributed to the increased production of maize by farmers. This confirms an assertion by MINAGRI (2011) that reducing post-harvest losses can increase the volume of staple crops within the market, leading to the availability of the crop within the market for consumption and for sale.

The improvement in quantity and quality of maize has led to the need for support from the outside community, such as banks to facilitate loans and credits provision for increased maize production. This is in line with the assertion made by ICA (2013) that cooperatives must work for the sustainable development of their communities. Therefore, the contribution to sustainable development element emerges when local financiers such as banks develop a working relationship with COAMV. The COAMV cooperative has received support from the Rwanda Development Bank (BRD) and Rural Sector Support Project (RSSP) in collaboration with other Non-Governmental Organisation (NGO's) who assisted COAMV with equipment for processing their maize into flour and other derivatives products.(See appendix 5 and 6)

In relation to these inputs, farmers expressed themselves by saying:

“The provision of agricultural inputs has really improved our production” (COAMV member, Burera, interview August 2013).

And

“The availability of the processing equipment has really eased the work load in processing the maize” COAMV member, Burera, August 2013.

As a result, agricultural inputs and loans provided by the cooperative had a positive contribution to the farmers' maize production process.

5.3.3 Marketing of produce

Apparently members prioritised market access as one of the relevant services that COAMV is offering to its members. COAMV has been able to achieve this through purchasing the farmers produce just after harvest. This process has enabled farmers to have a ready market for their produce and also reduced potential obstacles such as developing networks and logistical preparations which could prove costly to farmers if they are to initiate the marketing process on their own. COAMV has therefore created a reliable network for supplying the maize to the cooperative and also it is a reliable source of price information for the farmers. The contribution of the buying activity created by the cooperative has created an enabling environment for the farmers in terms of accessibility to the markets. The farmers indicated that the cooperative buys their produce at a favourable price compared to the local markets, and the result has been an improvement on farmers' income. This is in line with WFP (2011) which reported that agricultural cooperatives in Rwanda is aimed to boost agricultural production and improve the income of smallholder farmers through developing the markets for their produce.

5.4 Challenges and possible solutions

Cooperative members have faced a number of challenges in accessing services being offered by the cooperative. These challenges are categorized into provision of agricultural inputs, appropriate sponsorship for revolving fund, technical support and payment deadlines.

In terms of provision of agricultural inputs the farmers indicated that there are occasions where seeds and fertilizers are not timely made available to them. This problem has been perceived to negatively affect the maize production process, leading to delay in planting, plants being attacked by pest which has the potential of resulting in poor quality maize production. This is one of the factors that have contributed to the variation in production patterns by farmers, also evidenced in different access to forms of loans and credits.

According to the results, the revolving fund is currently not effective if it is to be solely relied upon as a form of credit because farmers highlighted concerns such as not being able to generate enough resources to conduct income generating activities from the fund. The fund itself cannot sustain itself without intervention from other sources; therefore there is a need to overcome the financial constraints responsible for funding opportunities to the cooperative. Farmers indicated the need for improved sponsorship patterns and proper management of funds by the cooperative.

In relation to management of funds, farmers highlighted the needs to improve payment deadlines by the cooperative. Farmers highlighted that it would be appropriate for them to be paid immediately after delivery of their maize produce to the cooperative. So as not to disrupt immediate and future plans that the farmers have in relation to the agriculture production. The farmers need this delay to be avoided as to enable them to diversify into other income sources that are not related to maize production in order to generate more income for themselves. This suggests a possible linkage between delays in payment and the ability to diversify.

COAMV cooperative has a single agronomist which is expected to assist farmers in their agricultural production process. As a result, this has created inaccessibility to the technical specialist for some cooperative members because the specialist cannot manage to support all farmers with the required time frame. The major challenge observed with this arrangement is that the farmers who fail to access the agronomist on time end up practising improper farming practices which lead to poor maize quality and less quantity, thereby negatively affecting their income levels. COAMV has reported that it is working on recruiting a second agronomist to alleviate the challenge.

WFP (2011) stated that smallholder farmers through cooperative can access to training opportunities such as training in postharvest techniques which contribute to reduce the losses and increase the production improved quality. The study indicate that the unavailability of the agronomist doesn't allow farmers to benefits all opportunities from technical support as the resultant failure by farmers to produce quality maize due to lack of consultation.

5.5 Investment of income

The farmers indicated that they are making profits from the sale of their maize produce. The study revealed that the formula they used to calculate their profits, farmers did not consider factors such as the cost of labour spent in their farming activities. Seeds and fertilizers have been identified as the cost of investment. Therefore there is a need for COAMV to facilitate the training of farmers in other areas such as basis in business and financial management in line with other services already being provided. The farmers acknowledged also the profit making to the role played by the cooperative in providing a ready market for their produce, even though there are challenges involved. Also, the farmers acknowledged that part of the profit making is attributed to a reduction in having to worry about the process of creating networks and other logistical arrangements required to transport the produce to other markets where prices may not be favourable. In light of this background, COAMV has made a significant contribution to the profit making level for members/farmers thereby leading to positive development in their income status. This further confirms the statement of Chambo (2009) that agricultural cooperatives have an impact in the development of rural small farmers in terms of providing markets and enhancement of their incomes.

5.5.1 Agricultural production and payment of loans

With an above mentioned background in mind, farmers indicated that they have been able to reserve part of their income obtained to buy inputs for the next agricultural season and pay workers in the farming activities. The idea that farmers are reserving part of their income for purchase of agricultural inputs confirms some concerns raised by farmers that there is a

delay in provision of inputs by the cooperative, although the positive contribution not overlooked, this is an indicator that delays do occur. At this point, it can be argued that if COAMV timeously distributes inputs to farmers, the farmers would not invest in purchase agricultural inputs but on concentrate in repayment of loans.

The positive aspects that can be drawn from this scenario are that farmers have been able to produce, sell their produce and save funds for agricultural production in the next season, a positive development.

The advantage identified in loan repayment is that the cooperative has an option of retrieving loans in the form of maize produce after harvest from farmers. Although this is optional depending on farmers' consent, the farmers acknowledged that they are not under pressure to pay back in cash form, which is difficult to maintain as a form of repayment since there other possible demands for the use of cash other than loan repayment. This approach taken by the cooperative, cushions its members by providing them with more comfortable options for repayment. As a result, farmers are able to reserve cash proceeds for other income demands such as contributing to their household income.

5.5.2 Household level

The farmers have been able to identify household benefits they have managed to achieve as a result of proceeds they gained from selling their maize produce, through a maize production and selling process that has been supported by COAMV cooperative. All respondents from the study indicated that they have been able to achieve benefits and the identified ones are acquisition of land, house and livestock. Also included are payment of school fees, ability to pay health insurance and food diversification (that is now being able to consume different types of food the household could not previously afford). The respondents further identified now being able to purchase home appliances, bicycles, more clothes, shoes and the ability to have a personal savings. This result is similar to Chambo (2009) who reported that agricultural cooperatives maintain higher levels of income, making small farmers able to construct houses, send their children to school and provide health insurance to sustain rural livelihoods.

One striking outcome that is usually taken for granted is the ability to purchase shoes. All respondents indicated that they are now able to purchase shoes as a result of the proceeds obtained from the income generated through the sale of their maize produce at COAMV. Findings that have a significant higher response on terms of use of income generated from the sale of maize produce are the purchase of the livestock, food diversification and buying clothes for their family members and dependents.

It can be clearly said that COAMV cooperative has benefited and continue to benefit its members through the services it provides. The use of improved farming practices such as appropriate post-harvest and handling practices and application of advanced farming technologies such as fertilizers and seeds has led to farmers producing high yield of improved quality.

The maize produce which is already facing a ready market at COAMV cooperative has been able to generate income which enables farmers to pay back the loans previously obtained in the form of maize seeds, thereby being cushioned from further financial elements. This has enabled farmers to use the cash proceeds from the sale of maize produce to purchase assets, items and services that have improved benefit accrued to by their respective household. An address of challenges faced by the farmers and cooperative has the potential of improving not only the services offered by the cooperative, but also the benefits obtained by its members.

The positive contribution of COAMV services to the farmers and the district in general is stated in the following statement by one of the farmers:

“The training I received from COAMV has really improved my income from the sale of maize. I see myself being able to buy land and build a house in the near future”
COAMV member, Burera, August 2013.

As a result, COAMV cooperative has made a positive contribution to farmers' household income.

Chapter six: Conclusion and recommendation

6.1 Conclusion

The findings from the study indicate that agricultural cooperative have made positive contribution to the small holder farmers income. The members highlighted that they have a positive working relation with cooperative since they joined.

The study has shown that cooperative beneficiaries are not actively involved in setting the selection criteria of being a member of the cooperative. The criteria are set by the government of Rwanda which in turn presents it to the cooperative so that they can identify potential beneficiaries. The small farmers are then encouraged to join the cooperative through provision of incentives. This reflects the top down nature of the intervention and affects the farmers' ability to organise themselves without the external intervention.

COAMV cooperative members are involved in maize production. They indicated that prior to joining the cooperative they experienced the challenges related to low yields and they could not generate the enough surplus to obtain income for household purpose. After joining, they managed to obtain access to agricultural inputs and improved technology such as fertilizers and improved seeds. These inputs combined facilitated the increase in maize production quantities, which enabled farmers to produce surplus and sell for profit.

The members however have experienced challenges related to access to the services offered by the cooperative. These include delays in provision of agricultural inputs such as seeds, and delays in the processing of payments for maize to the cooperative. The farmers were concerned that such delays needed to be solved so that they will not affect agricultural production for the next season.

Other areas that needed improvements included the employment of agricultural specialist such as the agronomist so that there will not be an overwhelming demand for the services, and the resultant failure by farmers to produce quality maize due to lack of consultation.

The revolving fund also needs to be improved so that farmers can manage to run projects which can generate more income and contribute to the purchase of more agricultural inputs.

The advantages highlighted by farmers are comfortable ways of repaying the loans obtained from the cooperative in the form of maize seeds and preferably not in cash. This has enabled the farmers to reserve their cash proceeds to purchase items and services for personal household consumption. The establishment of the cooperative as a ready market for the farmers has cut down transportation and networking costs, enabling farmers to reserve money for household consumption.

From the proceeds obtained from selling maize to the cooperative, farmers have managed to pay back the loans they took at the beginning of the season, they have managed to set aside amounts for investment into the next season and also managed to purchase household items, properties and services for their own consumption. These include land, livestock, shoes, clothes, health insurance and food diversification within household. The farmers indicated that as a result of joining the cooperative, they have benefited by acquiring the above assets, items and services through income generated from maize production. As a result, services and activities from the cooperatives have positively contributed to the small holder farmers' income.

6.2 Recommendation

In conjunction with the recommendations that were suggested during the interviews and discussed in the previous section, the following recommendations were arrived:

It is evident from the findings, that the activities and services of COAMV cooperative have been contributed to maize production and subsequent income level of its members.

- There is need to educate farmers on the objectives of establishing cooperatives so that they are aware of the role they are supposed to play.
- There is need for the cooperative to prioritize the distribution of the inputs to members whenever there is a delay for beneficiaries who have access to seeds and fertilizers as only form of loans and credits.
- PHHS TF needs to link the producers to rural banks where they can be assisted with loans and credits to expand their scale of production
- There is need for further support in terms of financial support to improve the revolving fund initiative. The cooperative needs to network further and gain more support from the government so that it gets donors for its financial project.
- The cooperative needs to improve its administrative procedures in order to process farmers' payments in production. Administrative procedures related to information technology can be solved through obtaining appropriate office equipment such as computers and internet connectivity that would facilitate faster communication and payments for farmers.
- There is also a need to improve staffing levels for the specialist staff such as the agronomist. If there are problems related to the recruitment and retention of such staff, the cooperative through support from government or donors should consider paying more incentives for such staff in order to retain them and be able to effectively serve its beneficiaries.

Reference

African Development Foundation, 2013. Project Description: COAMV Maize Processing. Available at: <<http://www.adf.gov/documents/1808-RWA-A.pdf>> [Accessed 14 July 2013].

Chambo, 2009. Agricultural cooperatives: Role in Food Security and Rural Development. Available at :< <http://www.un.org/esa/socdev/egms/docs/2009/cooperatives/Chambo.pdf>> [Accessed 11 September 2013].

Deptford and Hall, 2011. A cost of diet analysis in a northern highland district of Rwanda. Available at: <<http://www.heaweb.org/download/file/fid/47>> [Accessed 1 September 2013]

Barret C.B. and Reardon T., 2000. Asset, Activity, and Income Diversification among African Agriculturalist. Available at: <http://inequality.cornell.edu/publications/working_papers/Barrett-Reardon-Webb_IntroFinal.pdf> [Accessed 14 July 2013].

COAMV, 2010. COAMV cooperative business Plan 2010-2014. (*Unpublished*)

Department of Agriculture, Forestry and Fisheries, (2012). A framework for the development of smallholder farmers through cooperative development. Available at: <[http://www.nda.agric.za/doaDev/sideMenu/cooperativeandenterprisedevelopment/docs/FRA MEWORK-%20OF%20SMALL%20FARMERS%20\(2\).pdf](http://www.nda.agric.za/doaDev/sideMenu/cooperativeandenterprisedevelopment/docs/FRA%20MEWORK-%20OF%20SMALL%20FARMERS%20(2).pdf)> [Accessed 14 July 2013].

FAO, 2010. The state of food Insecurity in the world. Available at <<http://www.fao.org/docrep/013/i1683e/i1683e.pdf> > [Accessed on 3 September 2013].

FAO, 2012. Agricultural Cooperatives: paving the way for food security and rural development. Available at: <<http://www.fao.org/docrep/016/ap431e/ap431e.pdf>> [Accessed 14 July 2013].

Ellis F., 2000, Rural livelihoods and Diversity in Developing countries. Oxford: Oxford University Press.

Government of Rwanda, 2013. Agricultural Cooperatives have played an important role to sustainable food security in Rwanda. Available at: <<http://www.gov.rw/Agricultural-cooperatives-have-played-an-important-role-to-sustainable-food-security-in-Rwanda>> [Accessed 14 July 2013].

Herman, 2012; Perspectives on Cooperatives with reference to Rwanda, Available at: <[http://www.fes-uganda.org/media/documents/Cooperatives/Perspective_on_Cooperatives_in_Rwanda - Herman_Musahara.pdf](http://www.fes-uganda.org/media/documents/Cooperatives/Perspective_on_Cooperatives_in_Rwanda_-_Herman_Musahara.pdf)> [Accessed 24 August 2013].

Huggins C., 2013. Consolidating Land, Consolidating Control -State- facilitated agricultural investment through the Green Revolution in Rwanda. Working paper 16. Available at: < <http://www.plaas.org.za/plaas-publication/ldpi-16> > [Accessed 14 July 2013].

ICA, 2013. Cooperative helps to increase Food Security in Rwanda. Available at: < <http://ica.coop/en/media/news/co-operatives-help-increase-food-security-rwanda>> [Accessed 06 September 2013].

Mckay and Greenwell, 2007.Methods used for Poverty Analysis in Rwanda Poverty. Available at: <http://196.44.242.24/eicv/survey0/data/docs/studies/rwanda_poverty_analysis_methodological_note_first_draft.pdf> [Accessed 09 September 2013].

MINAGRI, 2009: Ministry of Agriculture and Animal Resources: Strategic Plan for the Transformation of Agriculture in Rwanda -Phase II, Final report.

MINAGRI, 2010. Ministry of Agriculture. Crop Production data2007-2010. Kigali. Rwanda

NISR, 2011: National Institute of Statistic of Rwanda; Rwanda Statistical Year Book 2011

NISR, 2012. The Evolution of Poverty in Rwanda from 200 to 201. Available at<
http://eeas.europa.eu/delegations/rwanda/documents/press_corner/news/poverty_report_en.pdf> [Accessed 26 August 2013].

NISR, 2012. EICV3 District Profile: North – Burera. Available at:
< http://www.statistics.gov.rw/system/files/user_uploads/files/books/BURERA.pdf>

[Accessed 23 June 2013].

RCA, 2013. Law no 50/2007 providing for the Establishment, Organisation and Functioning of Cooperative Organizations in Rwanda. Available at:
<<http://www.rca.gov.rw/spip.php?article94>> [Accessed 22 August 2013].

USAID, 2012. *Success story*: COAMV and USAID team up for farmers' economic empowerment. Available at:
<http://www.rwandaphhs.com/sites/default/files/success_stories/Success-Story-COAMV-USAID-Oct-12.pdf> [Accessed 14 July 2013].

WFP, 2011. Rwanda: Purchase for Progress. Available at:
<<http://home.wfp.org/stellent/groups/public/documents/communications/wfp217487.pdf>>
[Accessed 14 July 2013].

Annex 1: Questionnaire for smallholder farmers

The researcher is a graduate student at Van Hall Larenstein, University of Applied Sciences, Netherlands. This research is conducted as part of the requirements for the award of the Master of Management in Rural Development and Food Security. The information will be treated confidentially and will be used strictly for academic purposes and for future development interventions that will benefit COAMV Cooperative.

Questionnaire number:

Date:

Background information

Number of years as COAMV member:

I. COAMV services influencing quality and quantity of maize

1. What are the activities and services offered by the cooperative that you think are relevant for your maize production? Can you give reasons for your choice?
2. What are the important things that you consider if you want to produce maize that will attract your potential buyers?
3. What are you currently doing to make sure you produce maize that is attractive to your buyers?
4. How much maize in tonnes have you been able to produce before and after you joined the cooperative?
5. What credits and loans are availed to you for inputs used in maize production?
6. What are your suggestions to improve COAMV Cooperative?

II. Challenges faced by members in implementing cooperative activities

1. Which of the services that are being offered by the cooperatives that you are experiencing problems in working with?
2. What are the reasons for the problems that you are experiencing?
3. For how long have you been experiencing these problems? What are the reasons?
4. How have these problems affected your agricultural production?
5. What do you think is the possible solution for you to be able to realise the full benefits of the services?
6. What has the cooperative done in order to help you in addressing the problems you are facing?

III. Profits from income generated from maize production

1. From the maize that you are selling, are you gaining any profits?
2. If yes, what are the reasons that you believe are giving you the profits?
3. If no, what are the reasons for the losses?
4. How has your involvement with the cooperative affected the profits that you make from selling maize?

IV. Investment of income from selling maize

1. From the income you get from selling maize, how much do you set aside for re-investing into agricultural production? What are the reasons?
2. How much of your total income do you use for payment of loans and credits? What are the reasons?
3. How much of the total household income do you use for total household consumption? What are the reasons?
4. Are there any benefits for your household that you are currently earning and were not able to do before joining COAMV cooperative? Can you give reasons?

Annex 2: Questionnaire for COAMV representatives

The researcher is a graduate student at Van Hall Larenstein, University of Applied Sciences, Netherlands. This research is conducted as part of the requirements for the award of the Master of Management in Rural Development and Food Security. The information will be treated confidentially and will be used strictly for academic purposes and for future development interventions that will benefit COAMV Cooperative.

Questionnaire number:

Date:

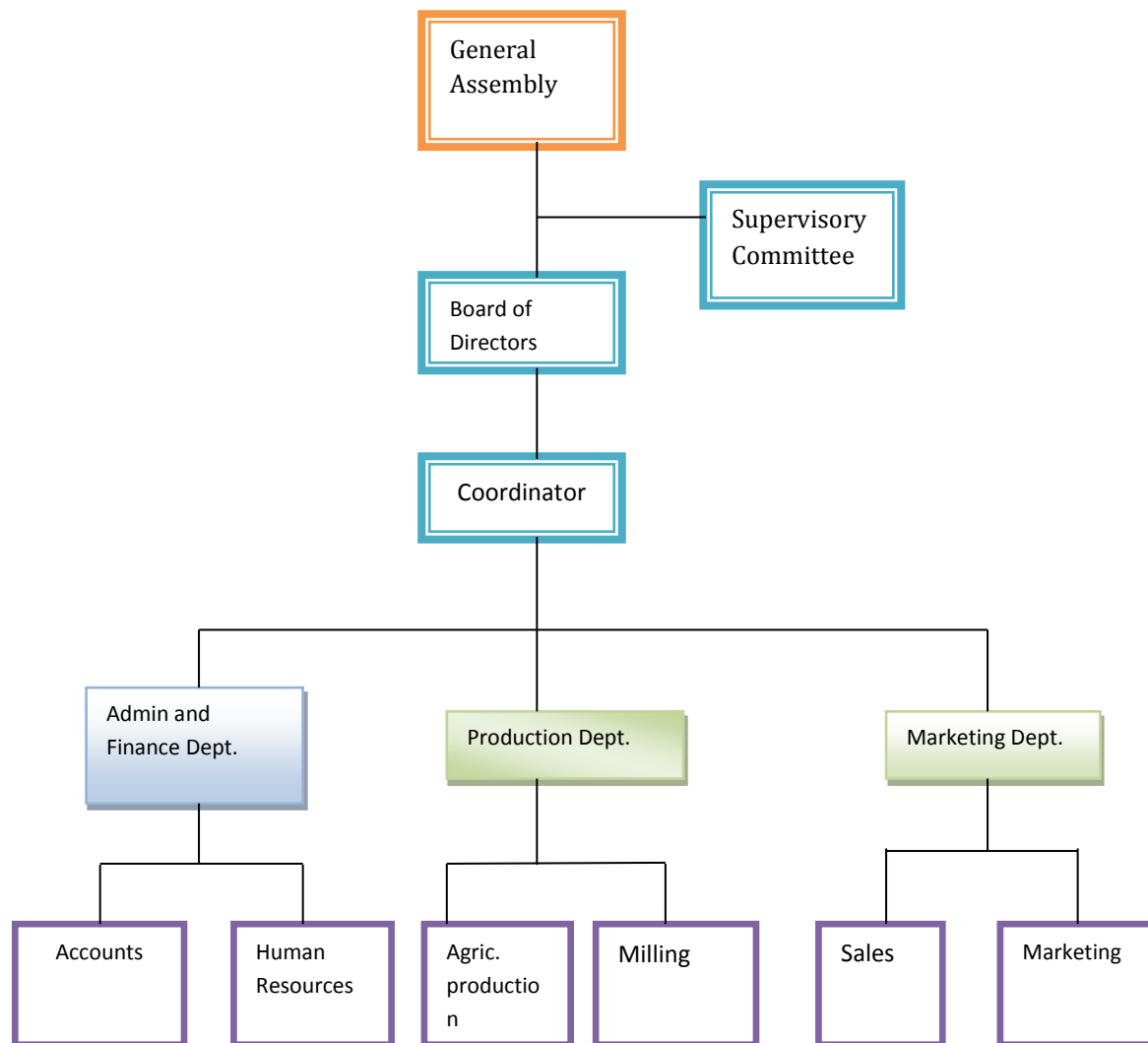
V. Criteria used by COAMV cooperative for accessing its services

1. What are the requirements for a farmer to qualify as a member of the cooperative?
2. What are the reasons for developing such a criteria?
3. Who defines such a criteria and why?
4. What is the role of potential beneficiaries in developing the criteria for selection?
5. How are the services you are offering related to the group of beneficiaries that you have chosen?

Annex 3: checklist for focus group discussion

- Production and Processing of improved maize
- Quantity of improved maize processed
- Availability of raw materials/ Agricultural inputs
- Market access
- Sale of maize
- Access to loans and credits
- Household income
- Income from sale of maize
- Savings
- Remittances Other income generating activities
- Household resources
- Re-investment

Annex 4: Organogram of COAMV Cooperative



Annex 5: COAMV Maize processing equipment



Annex 6: Donations and other financial support received by COAMV

Name of financier	Area of intervention	Amount (in FRW)	Observations
Projet Gestion des Espaces Ruraux du Buberuka (PGRB)	Training of 80 members of agricultural groups in maize production and harvesting	800,000	Donation
Banque Rwandaise de Développement (BRD)	Purchase milling machine and huller and 2 Daihatsu lorries.	67, 000,000	<p>Provided in two separate lyres :</p> <ul style="list-style-type: none"> • A loan of 22 million FRW obtained in 2003 and fully repaid. This loan was given on favorable terms to be repaid at 60% and the remaining 40% to be supported by RSSP. • A loan of FRW 45 million obtained in 2006 to be repaid in 5 years. This loan is still on and the unpaid balance as at June 30, stood at FRW 21,633,978
Rural Sector Support Project(RSSP)	Purchase office furniture, Achat équipements de bureau, construction a shed and drying room, staff training and salary support	131,153, 243	Donation
MINAGRI	Purchase 5,902 kg of seed potato	973,912	Donation
ACDI/VOCA	Training COAMV personnel in management	1, 430,000	Donation of USD 2,500
United States African Development(USADF)	Staff salaries for 12 months, purchase and installation of accounting software, spares and developing a business plan.	47, 375,725	Donation extended in 2008

Annex 7: Loans and Credits accessed by CAOMV members

Respondent	Form of Credit and loans		
	Revolving Fund	Seeds	Fertilizer
1	X	X	X
2		X	X
3		X	
4	X	X	X
5	X	X	X
6	X	X	X
7		X	X
8	X	X	X
9		X	X
10	X	X	
11		X	
12	X	X	X
13	X	X	X
14	X	X	
15		X	X
16	X	X	X
17		X	X
18		X	
19	X	X	X
20	X	X	X

Key

Seeds Only	Seeds and Revolving Fund	Seeds and Fertilizer	Seeds, Revolving Fund and Fertilizer

Annex 8: Benefits realized by farmers

Respondent	Benefits Realised
1	L, LV, FD, HI, HA, CL, PS, SH
2	HS, LV, FD, HI, BIC, CL
3	L, LV, SF, FD, SH, HI, BIC, CL, PS
4	L, LV, SF, FD, HI, BIC, CL, PS
5	L, HS, LV, SF, FD, HA, CL, SH, PS
6	HS, LV, FD, SH, HI, CL, PS
7	L, LV, SF, FD, BIC, CL, PS
8	L, LIV, SH, SF, FD, BIC, PS, CL
9	L, SH, LIV, SF, FD, HI, CL
10	L, LIV, SH, SF, PS, HI, CL, FD
11	LIV, HI, HA, BIC, CL, SH, PS
12	L, LIV, SF, PS, FD, HI, CL, SH,
13	L, LIV, SF, FD, HI, CL, SH, PS
14	CL, L, FD, SF, SH, HA, CL, BIC
15	HS, SF, LV, FD, HI, CL, PS, SH
16	HS, L, SH, LIV, SF, FD, HI, BIC, CL
17	L, HI, HA, BIC, CL, SH, PS
18	LIV, SF, FD, HI, CL, SH
19	LIV, L, SF, FD, HI, BIC, CL, SH, PS, BI
20	H, LIV, SF, FD, HI, BIC, CL, SH

Key:

L: Land
HS: House
LV: Livestock
SF: School Fees
HI: Health Insurance
FD: Food Diversification
HA: Home Appliances
BIC: Bicycle
CL: Clothes
SH: Shoes
PS: Personal Savings

Annex 9: Maize Post-harvest activities