THE ROLE OF RURAL SUBSISTENCE FARMING COOPERATIVES IN CONTRIBUTING TO RURAL HOUSEHOLD FOOD AND SOCIAL CONNECTIVITY: THE CASE OF MWENDO SECTOR, RUHANGO DISTRICT IN RWANDA

Sylvester Mbanza and Joyce Thamaga-Chitja
University of KwaZulu-Natal, South Africa.
chitjaj@ukzn.ac.za

ABSTRACT
Subsistence agricultural cooperatives play an important role in improving household food security among rural households. In Rwanda, as in many African communities, traditional systems encompassing the concept of Ubuntu including ideas related to co-operation, solidarity, mutuality, reciprocity are evident in both the society and subsistence farming ideologies. The majority of the population resides in rural areas; mainly rely on subsistence farming in their smallholdings and participate in subsistence farming cooperatives. The main purpose of this article is to determine the rural subsistence farming cooperative success factors; highlight the benefits of participating in farming cooperatives and find out why some people do not participate in any farming cooperatives. This article focuses on maize, pineapple and peas cooperatives in the Mwendo Sector in Rwanda. A random sampling was used to select cooperatives and questionnaires were administered to 150 cooperative members in the study. Both key informant interviews and focus group discussions were used for data collection. Data was analyzed using cross-tabulation and content analysis. The results revealed that the factors influencing productivity of cooperative and household food security are the availability of agricultural equipment, agricultural inputs, age and level of education of cooperative members, training of cooperative members, cooperative organization government assistance and provision of extension services. The research also shows that cooperative members have an increased agricultural production, income, government assistance, easy market access and agricultural training. Increased agricultural production and income are both important to access dimensions of food security. Agricultural cooperatives also promote culture and unity in the locality through social and religious activities among cooperative members. Findings show that the unwillingness to be part of cooperative mismanagement; punitive measures and fear of seasonal hunger lead to non-participation in agricultural cooperatives. This is significant as it indicates departure from Ubuntu and co-operating principles that often characterize rural communities. Therefore, improving above-stated factors would improve participation in farming cooperatives.

Keywords: Subsistence farmers, factors, benefits, agricultural cooperatives.

INTRODUCTION
Subsistence farming cooperatives have the potential to improve food security and reverse poverty in poor households of Rwanda. Promotion of collective farming properly channels government assistance and increases agricultural food production of subsistence farmers (RCA, 2011). This study considers the situation of agricultural cooperatives in Mwendo Sector, Ruhango District in Rwanda. The focus is on four cooperatives producing pineapple, peas and
maize. The research surveyed seasonal activities of cooperatives in three different cells in the Mwendo Sector (Figure 1).

In Rwanda, as in many African communities, traditional systems encompassing the concept of *Ubuntu* including ideas related to cooperation, solidarity, mutuality, reciprocity are expected in farming cooperatives and farming systems. The formation and success of a co-operative often is based on the common bond between people of similar characteristics including social class, ethnicity, professional background and/or a combination of these factors (Wanyama, 2009). Therefore, trust based on social capital is of great importance. The objectives of the study were to determine:

- The role of agricultural cooperatives in household food security.
- The factors supporting the success of an agricultural cooperative.
- The reasons why some people belong to agricultural cooperatives while others do not.

The selected cooperatives were randomly drawn from a list of 23 agricultural cooperatives operating in the sector (local municipality) and are located in three cells (wards) of Mutara, Gafunzo and Kamujisho (Figure 1). All cooperatives were made up of subsistence farmers. Interestingly, one cooperative was mostly composed of youths, a different case among other Southern African context where many of the subsistence farmers are comprised of older women.

**Figure 1**: Map of Mwendo Sector indicating the study area (Produced by Rwanda Natural Resources Authority: Land and Mapping Department, 2013).
METHODOLOGY

This study was conducted from June to July 2013 in Mwendo Sector in Rwanda. Mwendo Sector is one of nine sectors of Ruhango District in the Southern province. It covers an area of 5,555 square kilometers and has about 23,231 inhabitants of which 12,023 are females. Sector counts an average density of 417 inhabitants per square kilometer and 5,036 households. Among these households, female headed-households are 3,278 and male headed-households are 1,258. The most cultivated crops in the Mwendo Sector are cassava, maize, bean, pineapple, rice, peas. (Ruhango District, 2010).

Data was collected from 150 randomly selected members of the agricultural cooperative. These members were selected from a number of cooperatives including 50 members from COPALE (Cooperative des agriculteurs des Legume also known as pea growers) located in Kamujisho cell; 50 members from COCUANGA (Cooperative des Cultivateurs des Ananas de Gafunzo) in Gafunzo cell and KOPAINTO (Koperative y’Abahinzi b’Intongwe also known as pineapple growers) in Mutara cell and 50 members from COAGRIMA (Cooperative des Agriculteurs de Maïs also known as maize farmers) in Mutaracell. Women made up 48.7 percent of the sample and men were 51.3 percent (Table 1).

Table 1: Gender of respondents in different cooperatives (n=150).

<table>
<thead>
<tr>
<th>Name of cooperative</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage (%)</td>
</tr>
<tr>
<td>COCUANGA</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>COPALE</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>COAGRIMA</td>
<td>29</td>
<td>58</td>
</tr>
<tr>
<td>Total</td>
<td>77</td>
<td>51.3</td>
</tr>
</tbody>
</table>

Focus group discussions with cooperative members, key informants and subsistence farmers were conducted to have an in-depth understanding of the cooperatives in the study area. The key informant interviews were conducted with a government official responsible for cooperatives in the Rwanda Cooperatives Agency (RCA), an agriculture officer in Food for the Hungry International (FHI), a non-government organization working with agricultural cooperatives and an agricultural extension officer in charge of Mwendo Sector.

Background of Rwandan situation

Rwanda is a small landlocked country situated in the Great Lakes region of East African center. It covers an area of 26,338 square kilometers with a population of 10,537,222 people (NISR, 2012). In Africa, Rwanda is among the most populated countries where the population density increased from 321 in 2002 to 416 people per km² in 2012 and the average annual national growth rate is 2.6 percent. Approximately 60 percent of Rwandans live in rural areas and the poverty rate is moderately high (NISR, 2012). Rwanda has four neighbouring countries and these include: Burundi in the South; Tanzania in the East; the Republic Democratic of Congo in the West and Uganda in the North (NISR, 2010).
Compared to the other sectors, agriculture provides 90 percent employment opportunities, 70 percent of export revenue and 91 percent of domestic food is supplied by the agricultural sector (IPAR, 2009).

In 2005 Rwanda identified cooperatives as a tool for poverty reduction and they are expected to play a key role in mobilizing rural people to contribute to the development of the country (Mukaruziga, 2010). In recognition of their socio-economic contribution, law no 50/2007 of 18/9/2007 was published to determine the establishment, organization and functioning of cooperative organizations in Rwanda. The government of Rwanda also established Rwanda Cooperative Agency (RCA) in 2008 with the following vision: “To promote an autonomous and economically viable cooperative movement founded on the cooperative values and principles and is able to enhance social integration and uplifting the standard of living of its members” (RoR, 2011).

Exploring the linkage of poverty and food security in Rwanda

Samner (2012) highlight that poor people spend less than $1.25 a day. Poverty is attributed as one of the causes of vulnerability to food insecurity. An individual or a household is not able to adapt during difficult situations. In food security studies, vulnerability refers to the inability to withstand the hostile environment such as shocks (Adger, 2006). The conditions of being vulnerable are determined by the social, economic, biological, physical and environmental factors that aggravate the conditions of not having sufficient food leading to hunger, famine and malnutrition (Gentilini and Webb, 2008).

Poverty in Rwanda is attributed to various reasons. Firstly, the genocide of 1994 against Tutsis led to the loss of about 1 million lives and has depleted the livelihoods of the Rwandans and brought about poverty in the country (Stanton, 2004). Secondly, the population density is too high, 416 people per square kilometer at national level and 514 people per square kilometer in Ruhango District where this study was conducted (NISR, 2012). Thirdly, the people of Rwanda depend on agriculture, thus the seasonal changes and climate variations often have a negative impact on their well-being and food supply. This sometimes leads to transitory hunger as the mechanization system in Rwanda is not well developed (Mupenzi et al., 2011). Even though, the majority of the population is involved in agriculture, they do not have enough land for farming. IFAD (2011) indicated that more than 60 percent of household cultivate less than 0.7 hectares of land, less than a hectare is cultivated by around half of the farm households and more than a quarter cultivate less than 0.2 hectare. Sometimes, a farm household can cultivate about five disaggregated plots in different locations (scattered) leading to low land productivity.

Relationship between small scale farming and food security

There is about half a billion people worldwide who cultivate 400 million farms which are less than two hectares (FAO, 2011). These farms sustain 1.5 billion people and provide 80 percent of the food supplies in developing countries (FAO, 2011). The majority of food producers in sub-Saharan Africa are small
scale farmers (Yengoh, 2012). According to Lipton (2006), the majority of poor people are found in the developing countries where more than two thirds of the workforce obtain their single income from agriculture. In Rwanda 86 percent of Rwandans still rely on agriculture for a living (DFID, 2012). Agriculture cooperatives help small farmers and other producers with food production, job creation and livelihoods (FAO, 2012). To improve household food production and food security, Rwanda is using agricultural cooperatives as a tool to increase agricultural smallholders’ production (RCA, 2011).

Small scale farmers in Rwanda sell part of their food production during harvest season and purchase food products during the lean season. This can subject and expose the population to poverty and hunger (IFAD, 2011). Lipton (2006) argued that good implementation of policies and agricultural developments of smallholders is crucial in poverty reduction. In Rwanda, an individual is considered poor if he is confronted by a complex of inter-linked problems and cannot resolve them and do not have enough land, income or other resources to satisfy their basic needs (GoR, 2002). Lipton (2006) argued that development of small scale farming in terms of labour, technologies and financial issues in developing countries has the potential to reduce poverty among smallholder farmers.

**Benefits of participating in agricultural cooperatives**

Agricultural cooperatives help farmers in various social and economic developments guided by cooperative principles including an equitable sharing of benefits (Özdemir, 2005). Through the agricultural cooperatives, farmers are able to increase farmer’s income, food availability, food security and reduce household poverty (Abdu-Raheem and Worth, 2011). The development of small scale agriculture offers diversity of food at household level and alleviates hunger and malnutrition by increasing household food consumption and creates economic opportunities for vulnerable people especially those who do subsistence farming (Hendriks and Lyne, 2009). However, Mavimbela et al. (2010) suggested that agricultural cooperatives are an important tool for improved household welfare as the members normally work together towards poverty reduction. Also, the cooperatives provide goods and services including technical assistance to its members so that they are able to attain increased income and savings for social and economic benefits of cooperative members (Ruccio, 2011). As argued by Jimoh (2012), cooperatives are required to supply the inputs including seeds, fertilizer, pesticides, herbicides, fuel, and machinery services and provide technical assistance to its members. Furthermore, cooperative members get these agricultural inputs and technical know-how at low prices which enable them to increase agricultural production.

While cooperatives improve market competition and expand market opportunities through rural markets, they also facilitate country development by increasing economy of rural areas as many rural people are involved in agrarian activities (Hagargi and Kumar, 2011). Unfortunately, there are still a number of challenges that preclude rural people of having access to markets. These include improper infrastructure, transportation, lack of contract farming and high transaction costs.
These often lead to weak logistics as well as poor distribution of agricultural products (Shiferaw and Teklewold, 2007). Olson (2009) argues that through farmers’ cooperatives, some market barriers like lack of market access, lack of power of negotiation capacity and political power, representation are mitigated.

It is also imperative to note that the formation of cooperatives facilitate access to numerous capital resources such as credit finance and loans (Novkovic and Power, 2005). In this case, the loan is given to the group of people which develop their social, economic needs and on the other hand there is a reduction of bank administrative cost of loans (Gana et al., 2009). Cooperatives also enable democratic support and social cohesion. Cooperative’s guiding principles also allow eligible members to participate equally in empowering their leaders, either directly or through elected representation (Mendoza and Castillo, 2006). These include social, economic and cultural conditions which facilitate the free equal practices of political self-determination (Dobrohoczki, 2006).

On the other hand, as mentioned by Emana (2009), the group activities promote the sociability and unity in cooperative members including provision of some assistance during social activities such as wedding ceremonies, religious and funeral activities. Sentama (2009) indicated that Rwanda cooperatives are not based on any discrimination. Some cooperatives are made of genocide survivors, former genocide perpetrators and their own family members. Hence cooperatives have helped in overcoming negative dehumanizing attitudes and nurturing social cohesion and positive attitudes and development agenda. Conversely, Nilsson et al. (2012) suggested that some people choose not to belong to cooperatives accusing the organizations of having a low level of social networks among individuals and rather found benefits when they worked as individuals.

RESULTS AND DISCUSSION

This section describes cooperative subsistence farming in Mwendo Sector. It also identifies the major factors that enhance agricultural cooperative’s success in the study area. The reasons why some subsistence farmers in the locality do not participate in cooperatives activities have also been highlighted.

Description of subsistence cooperative farmers

There are a number of subsistence cooperatives in the study area. Four selected cooperatives are legally recognized and they grow pineapple, maize and peas. These cooperatives were formed by members with the purpose of meeting their common economic, social, and cultural needs and aspirations (Davies and Mills, 2013). All cooperatives were formed in 2010 and have less than 2.5 hectares of land. About 51 percent of the members in the cooperatives are males whereas 49 percent are females. The majority of respondents (89.4 percent) are within 20-60 years age group. About 52 percent (78 participants) of the respondents completed primary education and only 5 individuals attended institutions of higher education. However, about 35 percent have never been to school or
completed primary education. This impedes the adoption of agricultural technology like the application of fertilizer, planting, etc. which has the potential to increase food production and innovation in agriculture (Oladeebo and Masuku, 2013).

Factors influencing agricultural production of cooperatives

There are many factors that positively contribute to agricultural production among cooperatives (Awan and Mustafa, 2013). Table 2 shows positive relationship between agricultural production and a number of factors including equipment used in agriculture, kind of training received by farmers and cooperative organization. Other factors that determine the operation of agricultural cooperatives include government assistance, inputs used in production and age of farmers. In addition, participants reported the availability of extension officers, marital status and level of education of cooperative members to play important role in their agricultural productivity.

Table 2: Factors influencing agricultural production of cooperatives.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Value</th>
<th>Df</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment used in agriculture</td>
<td>150.000</td>
<td>3</td>
<td>0.001</td>
</tr>
<tr>
<td>Training received</td>
<td>150.000</td>
<td>3</td>
<td>0.001</td>
</tr>
<tr>
<td>Cooperative organization</td>
<td>145.633</td>
<td>3</td>
<td>0.001</td>
</tr>
<tr>
<td>Government assistance</td>
<td>117.619</td>
<td>9</td>
<td>0.001</td>
</tr>
<tr>
<td>Inputs used in production</td>
<td>100.571</td>
<td>9</td>
<td>0.001</td>
</tr>
<tr>
<td>Age</td>
<td>80.682</td>
<td>15</td>
<td>0.001</td>
</tr>
<tr>
<td>Service provided by extension officer</td>
<td>75.903</td>
<td>12</td>
<td>0.001</td>
</tr>
<tr>
<td>Level of education</td>
<td>48.377</td>
<td>12</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Arayesh (2011) asserted that in agriculture many factors are combined in order to invigorate production yield and those include: political, managerial and sociocultural factors. In addition, economic, educational and psychological states of farmers are important to improve agricultural production.

Equipment used in agriculture

Equipment used in agriculture is very significant in improving agricultural productivity since it facilitates soil cultivation, crop planting, weeding, fertilizing, irrigation and harvesting. Besides, the use of advanced equipment, tools and land preparation methods play an important role in reducing human burden, fatigue and improves farm productivity (Kumar, 2011). In Rwanda, the hand hoe is the major equipment used in agriculture. The research results show that there is evidence of a relationship between equipment used in agriculture and agricultural production (p<0.001). The use of the hand hoe was reported as the main option due to the challenges of not having capacity of using improved tools like tractors and, animal-drawn equipment.
Equally important, key informants reported the cooperatives need to improve the existing tools particularly shifting from the hand hoe which is less productive to the use of tractors. The use of machinery would result in improved farmers’ efficiency and accelerate agricultural development (Odey et al., 2008). Ruhango District has one tractor-hire service but the cooperatives could not afford the tractor due to the high hiring cost.

Apart from the hand hoe being used for agriculture in cooperatives, watering cans supplied by Food for the Hungry International (FHI) were used to supplement water for agricultural production. Farmers affirmed that watering cans enable farmers to plant vegetables during dry seasons but an irrigation system is needed. Also, key informants reported irrigation systems as an efficient way of promoting agricultural productivity and profitability. Normally, the agriculture in Mwendo Sector receives approximately 1000 to 1300 mm of rain throughout the year and has two agricultural seasons (NISR, 2010).

**Level of education and training received in cooperatives**

The second factor influencing agricultural production of cooperatives is the level of education of the members as well as the kind of training received in a cooperative. The results in Table 2 indicate a strong relationship between the level of education and production (p<0.001). The significant relationship was also found between training received in a cooperative and production output (p<0.001). Nwankwo et al. (2012) concluded that in cooperatives, lack of training and educational opportunities prevent cooperatives’ production maximization which also hampers profitability. Key informants also clarified that cooperatives provide diverse training to the cooperative members. Some of the training provided included leadership, accounting, cultivation of crops and compost production as core elements affecting an increase of production outputs of Mwendo cooperatives. However, 12.7 percent of cooperative members did not receive any kind of training and those who received training complained that it was not sufficient. They need more training to increase production and strengthen farmer participation.

**Cooperative organizations**

Cooperative organizations’ have inscribed rules that are prepared and confirmed by cooperative members. These rules chiefly create the constitution of the cooperative that guide, and structure cooperative activities (Tchami, 2007). Results of the study displayed a significant and positive relationship between the cooperative organization factor and agricultural cooperative harvest at level 1 percent (chi-square 145.633, df = 3, p<0.001). As Schotanus et al. (2010) asserted, the internal organization of group members is one of the key success factors in the coordination of activities and communication and this requires every member to sufficiently commit and contribute his or her effort. Social capital among members is important where long standing social bonds are needed for management and collaboration among members.
However, all cooperatives in Mwendo Sector do not have the same internal organization, even the discipline system is differently maintained in order to safeguard and promote internal motivation like commitment, trust and altruism among members, in which penalties are better accepted and not always seen as punishment (Mansfield, 2005).

**Inputs used in production**

Agricultural inputs are imperative in farming systems and lack of sufficient investment in inputs results in a reduction of agricultural production growth (Zepeda, 2001). Evidence suggests that there is a significant positive relationship between input use and agricultural production ($p<0.001$). This finding is consistent with Aregay’s (2012) findings and proved that farmers who use inputs such as fertilizers and irrigation boost their agricultural production and better fulfill household needs. However, the use of fertilizer requires a substantial amount of farmer’s income which may be utilized in other household needs. Key informants discussions highlighted that low production is linked to low quantity of inputs used, particularly fertilizer and improved seeds. This is consistent with findings of Ortmann and King (2007).

**Age of cooperative members**

The age of a household head member has a role in agricultural production. These findings revealed a positive and significant relationship between ages of cooperative members and agricultural production ($p<0.001$). The descriptive statistic indicated that 33.3 percent of the participants in cooperatives were within the age group of 51-60 years in the study area. This implies that old people are substantially more involved in farming activities than young people. In contrast, the youth (<35 years old) in Rwanda makes up 78.4 percent of the population while 18.6 percent of the population is constituted of 36-65 year-olds and above this age is an old age pensioners’ group (NISR, 2010).

Interestingly, one of the cooperatives (COCUANGA) assessment was predominantly composed of young people. Youths who are engaged in farming are able to increase their income and they easily adopt new crop varieties and technology that leads to higher yields. This has an important impact on rural poverty reduction, employment creation and developing food production (Oyesola and Obabire, 2011; van der Geest, 2010).

**Government assistance and extension officer services**

Findings among sampled cooperatives indicate that they share one extension officer who is not only in charge of cooperatives but also other farmers in the Mwendo Sector. Results of the study showed a positive and significant relationship between extension officer and cooperative harvest (chi-square = 150.000, df = 3, $p<0.001$). Owombo et al. (2012) argues that frequent visits of extension agents helps transfer technologies to farmers as he/she trains them on how to use updated techniques like the application of fertilizers, use of improved seeds and also advise farmers on how to access and use machines and other
agricultural equipment. Equally important, the study showed a significant relationship between government assistance and production output in collective farming ($p<0.001$).

**Benefits of being in cooperatives**

Several benefits of participating in agricultural cooperatives were identified from the interviews. Information on benefits of cooperatives was obtained through focus group discussions and key informant interviews. Analysis revealed benefits being the ability to receive extension services, improved income and access to input supplies and markets. These were the same among the three cooperatives. Social benefit (being part of an effort in the community and connecting with others) was also listed as an important benefit of belonging to a co-operative.

**Income sources in the study**

Rural farmers in Rwanda are mainly characterized by low income and resource endowments. The main cause is that farmers possess small holdings which are fragmented making it difficult to pool resources together and improve farming income and living conditions (Ibitoye, 2012). Agricultural cooperative members in Mwendo Sector reported that they own very small land holdings and they have jointly cooperated to boost their household economy.

These farmers do not have reliable off-farm income generating sources due to poor infrastructure development. For instance, the locality does not have electricity or tarred roads. The respondents revealed that the other sources of income in the study area include selling household livestock and food crops to Vision 2020 Umurenge Programme (VUP) which is a government programme intended to lift poor people out of poverty. Agriculture was reported as the main source of livelihood for a number of respondents in the study area (NISR, 2011). In low-income families, improvement of income and employment are the key elements necessary for the development of household food security (Tarasuk and Loopstra, 2013). Therefore, a cooperative is one way of improving the livelihood and income to promote food security. The money received from cooperatives has assisted cooperative members in addressing household challenges. Cooperative participants indicated that the use of cooperative income in a family is predominantly directed to buy medical cover for household members, home appliances and food items that are not produced or grown (Table 4).
Table 4: Use of cooperative income in a household, 2013.

<table>
<thead>
<tr>
<th>Use of income from cooperative</th>
<th>COAGRIMA</th>
<th>COPALE</th>
<th>COCUANGA/KOPAINTO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency (%)</td>
<td>Frequency (%)</td>
<td>Frequency (%)</td>
</tr>
<tr>
<td>Buying seed and livestock for my own purpose</td>
<td>6 12</td>
<td>6 12</td>
<td>4 8</td>
</tr>
<tr>
<td>Help to buy school material and support in social activities</td>
<td>15 30</td>
<td>3 6</td>
<td>8 16</td>
</tr>
<tr>
<td>Buying home appliances, medical cover, clothes and food items</td>
<td>29 58</td>
<td>41 82</td>
<td>38 76</td>
</tr>
<tr>
<td>Total</td>
<td>50 100</td>
<td>50 100</td>
<td>50 100</td>
</tr>
</tbody>
</table>

Results show about 82 percent of income obtained in COPALE is used to buy medical cover, home appliances, clothes and some food. About 58 percent of income in COAGRIMA and 76 percent in COCUANGA and KOPAINTO cooperatives is used to purchase home appliances, medical cover, clothes and food. Income from cooperatives is also used to buy school materials for school going children and supporting a number of social activities. COAGRIMA spend 30 percent of income from cooperatives on school material and social activities, but COPALE use only 6 percent while COCUANGA and KOPAINTO use 16 percent of the income for school related expenses.

Furthermore, cooperatives encourage their members to obtain a number of assets including livestock to improve their living conditions (Wanyana, Develtere and Pollet, 2008). For instance, at household levels, COAGRIMA and COPALE cooperative utilize 12 percent of income to purchase seeds and livestock. Members illustrated that lack of access to formal credit was a big constraint to agricultural production. Access to credit has a potential to improve agricultural performance in cooperatives (Byaruhanga, 2013). If cooperatives could access credit, it would promote both agricultural production and household savings.

Production

Agricultural production of the cooperative is the main pillar of its development. To increase production, rural farmers significantly need basic farm inputs such as fertilizers, agricultural farm equipment and labour (Gathiaka, 2012). Key informants reported that cooperatives members participate in field trips and are supplied with a number of inputs including seeds, fertilizer, hoes, pumps and livestock manure. These inputs enable participants to improve their production despite that they do not meet their required quantities.

Skills in agriculture

Agricultural training enables cooperative members to improve their crop production (Nwankwo et al., 2012). The study found that cooperative members received
various agricultural training. However, few members were trained and there is a need to train cooperative members on a number of issues. Table 5 highlights some of the training received by cooperative members. Agricultural extension officers who provide training indicated a number of challenges including:

1. Low level of education of some cooperative members who are resistant to change and want to use the traditional agricultural methods.

2. Lack of funds to cover many cooperative participants.

Table 5: Training received in Cooperatives, 2013.

<table>
<thead>
<tr>
<th>Kind of training received</th>
<th>COAGRIMA</th>
<th>COPALE</th>
<th>COCUANGA / KOPAINTO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage (%)</td>
<td>Frequency</td>
</tr>
<tr>
<td>Pineapple growing and seed multiplication</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Production of compost</td>
<td>15</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>Vegetable and maize growing and field trip</td>
<td>27</td>
<td>54</td>
<td>35</td>
</tr>
<tr>
<td>Cooperative rules</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Not received any training</td>
<td>5</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100</td>
<td>50</td>
</tr>
</tbody>
</table>

Most of the cooperative members (60%) obtained training on seed multiplication, compost manufacturing, growing and mulching pineapples in COCUANGA and KOPAINTO cooperatives. Apart from pineapples’ cooperatives, about 30 percent of the participants in the maize cooperative (COAGRIMA) obtained training on compost manufacturing using organic matter such as leaves, food waste and some crop stems.

Practical skills on vegetable cultivation were provided to farmers in COPALE (70%) and COAGRIMA (54%) cooperatives. The biggest number of trained members was 70 percent in COPALE and 54 percent from COAGRIMA. Members of COAGRIMA cooperative were also trained in maize farming (preparation of soil, planting, weeding, harvesting, drying and shelling maize).

Participants indicated that they required training on improved agriculture, livestock production, project designs and entrepreneurship in order to improve farmers’ innovations in agriculture and adoption of other income generating activities (Tchami, 2007).

Social benefits of co-operatives and social cohesion

Social cohesion is one of the cooperative tools used to achieve its objectives as members have a sense of participation developing the cooperatives. Farmers indicated that a cooperative enhances unity among small scale farmers. First of all, it promotes food production through different activities carried out during cultivating, planting, harvesting and other post-harvesting activities. Members
also participate in social activities like wedding, baptism, burial and other social gatherings. In Rwanda, Sentama (2009) indicated that cooperatives play a major role promoting unity and reconciliation as some cooperatives are made of genocide survivors and former genocide offenders. About 19.3 percent of the participants noted that cooperatives promote social cohesion in a community. Furthermore, cooperatives members reported that being in groups provided social benefits including provision of employment, training and economic participation. Cooperatives also inculcate culture of democracy and equality among members (Dobrohoczki, 2006).

**Market benefits and its challenges**

One of the agricultural cooperative activities is to improve market access of cooperative products and allow poor farmers to tackle their problems and improve their living-standards (Allahdadi, 2011). All studied cooperatives reported that they have increased the marketing of their agricultural products. However, being located in poor rural areas, members emphasized having two main challenges. First, all farmers depend on rain fed production and have no storage facilities which result in higher supply of commodities than demand, leading to low agricultural prices. There is also poor road infrastructure.

**Reasons for not joining any cooperative in the study area**

Members of cooperatives in the study area grow a number of crops such as beans, cassava, maize, bananas, peas, sweet potatoes, carrots, pineapples, yams, cabbages, etc. Membership in these cooperatives is voluntary and any farmer is allowed to join or contribute in any cooperative (Ortmann and King, 2007). About 60 percent of non-participants of cooperatives indicated that there is no flexibility in a cooperative. For instance cooperative members wait for mature crops to be harvested while on their farms they reap crops for consumption at any time there is an acute hunger in the household or for sale when they need money. About 15 percent of non-cooperative aligned members reported that they feel limited within the cooperatives’ bureaucratic structures. Participants also responded that rules of cooperatives are tough hence any absence in the cooperative is penalized.
Table 6: Summary of results from non-cooperative members (n=20), 2013.

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

The majority (70%) of non-cooperative aligned members highlighted that they have a desire to join and participate in agricultural cooperatives. All of them showed the desire to partake in a cooperative describing that the members of cooperatives get help specifically during social activities like weddings, baptisms and other cultural or religious activities. Also, members are respected in the community and do not face problems with local government during government policy implementation due to the fact that the cooperatives’ system is a tool used by government for rural development and poverty reduction through employment creation and increased agricultural production (Adebayo, 2010).

In addition, respondents presented some of the expectations of participating in a cooperative. First, about 60 percent of respondents indicated that cooperative members have access to training relating to agriculture and cooperative management. Participating in cooperative activities increases a number of friends, power and voice in the community. About 40 percent of non-cooperative aligned members indicated that government and donors in Rwanda are interested in collective farming and cooperative members received surplus. So, joining cooperative would be a way of positioning one’s self for numerous benefits. However, there is a challenge of a high cooperative share and a non-cooperative aligned member need to pay in order to be accepted and ensure equal rights just like old members (Tchami, 2007).
CONCLUSIONS

The results from content analysis show that the agricultural cooperatives enable farmers to increase food production, income, access to market and training. Participation in a cooperative enables farmers to obtain agricultural skills and government assistance that are directed towards collective farming which increase production. Agricultural cooperatives also strengthen cultural cohesion, social unity and improve social networks through cooperative works, talks, as well as social and religious activities of the participants. However, where such social capital has been weakened, it results in the dysfunction of the cooperative efforts.

Factors influencing cooperative productivity were explored in the study. The results show cooperatives need advanced equipment, active age group members and training of members but the education level of participants is important to promoting skills of participants. These tools, equipment and method of work reduce human burden and fatigue and improve farm productivity compared to hand hoes. The organization of a cooperative shows an influence on agricultural production; the more efficient the cooperative organization, the more production was increased. The other factors which improve agricultural production are extension services and improved seed and fertilizer. However, cooperatives have a number of challenges including climate oscillations, low agricultural prices, transport and land fragmentation.

While cooperatives play a role in agricultural production, other residents do not belong to cooperative organizations, mainly due to the fear of cooperative mismanagement, laziness and the possibility of seasonal hunger since they cannot harvest immature crops from their farms. In order to achieve sustainable food production through subsistence farming, government together with its stakeholders should make every effort to sensitize poor farmers to joining cooperatives. The concentrated effort and focused assistance based on these factors will influence agricultural productivity.
REFERENCES


Food and Agriculture Organization, FAO. (2012a). *Agricultural cooperatives: Key to feeding the world*. Rome: FAO.


