

**WHICH MARKETING STRATEGIES CAN LEAD TO A HIGHER VALUE SHARE IN THE  
MUSHROOM VALUE CHAIN?**

*A case study of Duhuze mushroom cooperative in Rwanda.*



**Research Project submitted to Van Hall Larenstein University of Applied Sciences  
in partial fulfillment of the requirements for the awards of Master in Agricultural  
Production Chain Management, specializing in Horticultural Chains**

**BY Angelique Mukandekezi**

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**Van Hall Larenstein University of Applied Sciences**

**The Netherlands**

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6708 PB, Wageningen  
Postbus 411

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This work is dedicated to Almighty God for his guidance from the beginning of my study up to now and to my family for their encouragement during the entire study.

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Currency: 1 € = 920 rwf

€ = Euro

## **LIST OF ACRONYMS**

MINAGRI	Ministry of Agriculture and Animal Resources
MINICOM	Ministry of Trade and Industry
RCA	Rwanda Cooperative Agency
C-RATDC	China Rwanda Technology Demonstration Center
RADA	Rwanda Agricultural Development Authority
RAB	Rwanda Agriculture Board
RBS	Rwanda Bureau of Standards
NAEB	National Agricultural Export Development Board
PADAB	Bugesera Agricultural Development Project Support
RWF	Rwanda Francs
KG	Kilogram
IABU	Bugesera Mushroom Cooperative Union

## **ABSTRACT**

The research was done in order to identify the strategies that can link Duhuze cooperative farmers to the high value markets so that they can increase their income and well-being. The study was done due to the fact that the farmers of Duhuze cooperative in mushroom value chain do not have access to the markets which offer a better price so that they can generate income from the growing of the mushrooms.

The research was conducted in Nyamata cell of Bugesera District, eastern province, and in Kigali city in Rwanda. Two strategies such as survey, interview and desk research were used to collect the data. The survey strategy used semi structured questionnaire with closed and open questions for the farmers whereas a semi structured interviews using a checklist as a guide were used to interview the supporters, two processors, and ten mushroom buyers which include restaurants, hotels and open markets. Survey strategy was used to gather information from the farmers and each farmer was questioned individually, where a structured questionnaire was used to obtain information. Information obtained was about the actual situation of the chain. In this case the supporters of the farmers and the services they provides, marketing and production aspects including constraints encountered during the marketing of mushrooms. Information also was obtained about alternative channels to improve the well-being of the farmers. The quantitative data from the survey were processed using descriptive Statistical Package for the Social (SPSS) and quantitative data from interviews were analysed by using a chain map and stakeholder matrix. A SWOT was another analytical tool used to analyse the data from survey and interviews.

The study found that the stakeholders involved in the mushroom value chain are IABU act as input supplier, farmers of Duhuze cooperative act as producers as well as the retailer and the consumer, Lapalast rock hotel act as retailer, Nyamata open markets act as retailer and the consumers. The supporters of the chain were RAB and Centre Iwacu who provides trainings to the farmers. RAB was provides trainings on mushroom cultivation whereas Centre Iwacu provides training on market aspect. Three channels that are used to sell mushrooms by the farmers were identified and the value shares of the actors. Only Lapalast hotel was found to pay better price compared to other channels. The most important constraints encountered by the farmers were the poor linkages with the potential mushroom buyers such as hotels, restaurants and supermarkets and inadequate market information.

The study concluded that Duhuze mushroom farmers can be linked to the hotels, restaurants and supermarkets so that they can increase their income. It was found that conducting market research and organizing production system are the two strategies to be used to link the farmers to markets. For better access to information regarding the mushrooms, sharing of knowledge with other growers, there is a need to join Rwanda Mushroom Producers Organization.

The study found that the farmers need to organize marketing and production system in order to improve their income and well-being. Therefore, the study suggested recommendation on marketing organization, improvement on the production and support from advisors: there is a need to identify potential buyers such as hotels, restaurants and supermarkets in Bugesera district and in Kigali city. There is a need to establish linkages with the identified buyers. The strategy is to create a marketing committee who will go to negotiate with the buyers. To organize the production systems of the mushrooms to avoid over production and shortage of the mushrooms on the markets. To empower the farmers on the improvement of quality and postharvest technology of the mushrooms. To establish the relationship with other growers; the strategy is to make a partnership with the RMPO. To facilitate the value addition of the mushrooms; the strategy is to link the Duhuze cooperative farmers to the financial institutions to access loans.

## CHAPTER 1 INTRODUCTION

### 1.1 Background of the research

Bugesera District is one of the seven districts in the Eastern province of Rwanda. This district has 1337km<sup>2</sup> of total surface area and the arable land is estimated at 91,930.34 ha. The average size of land cultivated per household is 0.59 ha. The economy of the District depends on agriculture which has a population of 77.8% living on it. However, less is still produced for the markets therefore, the poverty is still high in the families (Bugesera, 2013).

Many years ago, Bugesera district was a major food production and supply area for the country. The main crops were cassava, beans, sorghum and banana. Thereafter, the region encountered prolonged droughts. This resulted in famine and malnutrition amongst families. The government therefore put much effort to increase agriculture production in this region by introducing the crop that can yield within the short time and setting up irrigation. Farmers were organized into the different cooperatives to improve their living standards (ADF, 2006). Farmers were organized into the cooperatives according to their preference about the crop. Hence, the cooperative of farmers were formed in the following field: banana, maize, rice, cassava, fruits and mushroom respectively.

Mushroom is a type of plant that has no flowers, leaves and true root. It has a stem and a cup called fruit body. Mushrooms are also called fungi and are divided into three categories: Edible mushroom which can be consumed as fresh or processed into different products such as dried or canned, the second category of mushroom is medicinal and they are used for the medicinal purposes and the third category is poisonous mushroom (Cheung, 2010).

In the past, the consumption of mushroom was not common in Rwanda. Mushrooms were considered as food for poor people, especially those of the rural areas. In the families who reared cows, mushrooms were seen as a big problem because of the belief that they destroyed the milk of their animals especially cows. It was a taboo to eat mushrooms together with milk. However, mushrooms are known to be nutritious food and have several other health benefits beyond nutritional provision. Cheung (2010) indicated that mushrooms are a rich source of nutrients that are important to the human body. They are high in protein, carbohydrates, minerals and vitamins such as riboflavin, niacin and folates. They have the minimum level of fats and starch content. According to Ng'etich, et al., (2013), mushroom have medicinal properties: they promote body's defence against various types of cancer; they fight against viral diseases infections including (HIV), diabetes, constipation and cardiovascular diseases.

Besides the nutritional and medicinal importance of mushrooms, mushroom industry has been identified to be a potential sector to contribute positively to the rural and urban people's economic life. These people can be benefited by growing mushrooms to create the employment as well as to generate income among their families. This due to the fact that mushroom are easy to grow, high yield can be obtained from the small unit of land, wide adaptability to the agriculture residue to grow and have a short production cycle. Both men, women and youth can grow the mushrooms (Gateri, Muriuki, Waiganjo, Ngeli, 2009).

Therefore, considering the importance of mushrooms, the Ministry of Agriculture has called on Rwandan farmers to take on commercial mushroom growing as one of the crops against malnutrition and employment creation for their economic development (MINAGRI, 2014).

Despite its importance, mushrooms that have been used in Rwanda for many decades were gathered from the wild. They differ in their size and colour. These wild mushrooms are insufficient and grow seasonally in the rainy season from October to December and March to April every year.

## **1.2. Background of mushroom cultivation in Rwanda**

In Rwanda, Technoserve project started to develop mushroom cultivation in 1986 by teaching people how mushroom spawn are produced. At that time, mushroom was only cultivated in the biggest cities of Rwanda like Kigali city and Butare. Nevertheless, the mushroom were not extended to the rural areas because there was no means of support to sensitize its production and consumption. In 1997, the United Nations Development Programme (UNDP) also supported mushroom cultivation by teaching the farmers who were in the associations on how to make mushroom spawn. At that time, mushrooms were grown in the houses. However, till in 2003 there was no improvement made (RADA, 2011).

Therefore, in 2006 MINAGRI introduced mushroom cultivation based on grass and agricultural residue. It established a base for mushroom spawn production by using Juncao technology which was originally applied in China. The technology involves the use of agriculture wastes as substrates which are available in Rwanda and Oyster mushroom (*Pleurotus ostreatus*) is the variety that was chosen to be grown (RADA, 2011). In Rwanda, the most agricultural residue used to grow mushrooms are maize straw and cobs, sorghum straw, wheat straw, cotton seed hulls, rice bran and bean residues.

Despite the above history, mushroom cultivation is an important emerging industry in Rwanda. As a result of efforts made by the government of Rwanda through the MINAGRI in promoting mushroom cultivation, the sector is dominated by small holder farmers who are involved in mushroom growing while other companies are in seed multiplication. At present there are 12 mushroom cooperatives and 10 companies from all over the country who are involved in the mushroom growing and seed multiplication and sell the tubes to the farmers. More than 1000 farmers are involved in the mushroom growing. Rwanda Agricultural Development Authority (RADA) which is a former RAB organized these 22 established companies, cooperatives and formed an organisation called Rwanda Mushroom Producers Organisation (RMPO).

## **1.3. Research problem**

The farmers expected to generate income through selling the mushrooms to the local markets. Mushrooms have a short growth cycle, and being a perishable product, they need a well-organized and accessible sale channels. However, there is a lack of regular markets which offer a better price and therefore farmers are selling their produce at a low price to their neighbours, leading to low income generation and development. The farmers of the Duhuze mushroom cooperative are experiencing the problem of selling their mushrooms to their neighbours at a low price due to lack of access to markets which offer a better price, leading to a negative effect on their well-being.

## **1.4 Justification for research**

Mushroom cultivation has been identified as a potential sector with diverse advantages to the poor farmers. It cannot only be grown for nutrition and food security, but also for improved livelihoods through income generation and job creation. Furthermore, this crop gives an opportunity to men as well women and youth to participate. The small holder farmers can benefit from this crop by creating a sustainable production together with the access to the local markets (Gateri et al., 2009). The farmers of the Duhuze cooperative, which is located in the eastern province of Rwanda, are characterized by the problems of not getting a reasonable price from their products. This problem can make farmers leave the mushroom sector. Therefore, seeking new market opportunities that offer a better price to the farmers is crucial. This explains why the research needs to be conducted in order to identify the strategies to link the Duhuze mushroom cooperative to the markets which offer a better price. This will enable farmers to turn their business in mushrooms into a sustainable production activity so that their well-being can be improved.

### **1.5 Problem owner**

IABU (Bugesera Mushroom Cooperative Union).

### **1.6 Research objective**

The objective of the research is to identify strategies that link the Duhuze mushroom cooperative farmers to high value markets in order to enhance their wellbeing.

### **1.7 Main research questions**

**Main question 1: What is the composition of the mushroom value chain in the Bugesera district?**

#### **Sub-Questions**

- 1.1. Who are the stakeholders involved in this chain?
- 1.2. How does information flow in the chain?
- 1.3. What are the value shares of the actors in the chain?
- 1.4. What are the constraints encountered in the mushroom chain?

**Main question 2: What are the available market options for the Duhuze mushroom cooperative farmers?**

#### **Sub-Questions**

- 2.1. What are the current marketing channels being used by Duhuze mushroom cooperative farmers?
- 2.2. Who are the competitors of the Duhuze mushroom cooperative farmers?
- 2.3. What are the quality requirements with regard to mushroom marketing?
- 2.4. What are the constraints the Duhuze mushroom cooperative farmers faced in the marketing of their mushrooms?
- 2.5. What are the alternative channels to improve farmers' income?

### **1.8 Definition of the concepts**

**Value chain** is the successions of activities required to be carried out in order to bring the products or services from the point of the production to the end user. Before the product or services reach to the end user, it passes through different stages such as production, collection, processing, packing, storage and distribution. This requires a well-functioning of those who are in the chain. The aim of the value chain is to deliver a valuable product or service in a sustainable way. In the value chain, the value is added to the product at each stage. A number of stakeholders have to be involved in order to bring the product or service to the final consumer (Nang'ole, Mithöfer and Franzel, 2011).

**Mushroom tube** refers to the mixture of sterilized substrates containing mushroom spawn

**Markets** refer to the person, companies, institutions or food services that can buy a product from the producer. It is also a place where a producer can bring their harvest and sell to the buyers or customers.

**Market information** refers to the information that sellers can get and help them to know where they can sell their products and at which price. Also the sellers can know what time, quantity and quality a product is needed by the markets.

**High value markets** are the markets that can provide or pay a higher price.

**Market options** refer to the possible or choice of markets that are available for a company or an organization in order to sell its product or service.

**Stakeholders** are the people who have an impact on the activities that are carried out along the chain in order to bring the product or service to the final consumer. They are divided into two groups; externals and internals. Externals are also called supporters of the chain whereas internals are called the actors who directly deal with the products. Supporters do not deal directly with the product, they provide other services like financials, extension services, set the policies regarding to the product which intended to be produced and marketed.

**Information flow** is the information sharing including exchange of ideas or knowledge, the way of information is delivered or gathered within the value chain. It is also the way ideas or knowledge is shared among the actors and their supporters in the chain. The information can be related to the quality of product, volume, price between the buyers and sellers. It can be also related to the dissemination of knowledge required to bring a product to its end user (Rashed, Azeem and Halim, 2010).

**Value shares** are the percentage of the final, retail price that the actor earns. (KIT and IIRR, 2008). In this research, the value shares of some actors in the chain (farmers and retailer) will be calculated.

**Marketing channels** also called distribution channels are the networks composed of interdependent institutions that have banded together for purpose of trade and mutual advantage (Metha, Anderson, Dubinsky, Polisa and Jolanta, 2010).

**Competitors** are the companies, people or a team who are producing similar products or services and can deliver to the similar consumers. For the company of an organization; it is crucial to know its competitors and how they operate.

**Quality requirements** refers to the quality of the products that is required or demanded by the customer or the markets. The word quality itself “means the meeting or exceeding customers’ expectations” (Luning. and Marcelis, 2009). Hence, in order to satisfy customers’ desires, it is essential to produce what they want; how to produce it, what quality is preferred so that one can produce product based on the customer requirements.

**Alternative market channels** refer to the possible arrangements that a company can be used to transfer the product from its point of production to the point of consumption. For instance, producers can sell their produce to the supermarkets instead of selling to the open markets. In this case, the product can pass through to different level before reaching to the consumer or end user. These arrangements that a company can adopt, depends on the number of intermediaries involved in delivering the products to the final consumer (Kiran, Majumdar and Kishore, 2012).

## **CHAPTER 2. LITERATURE REVIEW**

This section provides information on the different aspects related to the research such as value chain, value share in value chain, stakeholders, information flow and marketing of mushrooms. This was done by reviewing the books, journals and organization reports accessed through internet.

### **2.1. Agriculture in Rwanda**

Agriculture is the mainstay of Rwanda's economy. This is due to the climate which is conducive to the wide range of agriculture commodities including horticultural crops such as fruits and vegetables. Agriculture sector provides employment opportunities and income generation to the Rwandan people of whom about 83.4% live in the rural areas. Government of Rwanda has found that development of agriculture sector is the main key in order to strengthen its long term economic growth. Rwanda has identified several ways to achieve its goal. One way was to revise its national agriculture policy and strategies. Given that, one of the key pillars of the MINAGRI's vision is the transformation of Agriculture from the subsistence to a productive high value crops, market oriented farming that is environmentally friendly (NSR, 2012). (Byaruhanga, 2013) indicated that in rural area of Rwanda farmers rely on farming and livestock rearing. To organise those farmers into groups such as cooperatives was another way identified by government of developing agriculture sector. It was found that to work under the cooperative gives an opportunities to the farmers to market their produce and generate income. Working together provide them to access the market information, to get inputs, extension services and other financial support.

### **2.2. Mushroom Production in Rwanda**

In Rwanda, mushroom cultivation is still small industry. This is due to the fact that cultivated mushroom is a new crop. Rwandan farmers were familiar with the wild mushrooms which comes seasonally. Similarly, the good techniques of cultivation of this crop was not known by the Rwandan farmers before. Thus, the new techniques was originated from China which involves the use of Juncao technology and it was found that it is suitable for smallholder farmers. By using this technology, farmers can harvest several kilograms within 10 days (Tribrichu and Buykusenge, 2009).

Juncao technology was invented by Professor Lin Zhanxi. In 1987, he named this technology JUNCAO: Jun means fungi and cao means grass in Chinese. Hence, Juncao technology meaning is the cultivation of mushroom by using grasses. He found about 33 kinds of leguminous plants that can be used to grow mushroom as substrates. He added that these grasses have to undergo some processing such as drying, grinding and storage before being used (Oei.P, 2005).

Oyster (*Pleurotus ostreatus*) mushroom is the variety which was chosen to be grown in Rwanda even though other varieties can be grown. This is because of its adaptability Rwandan climate and wide range of agricultural waste available in the country. Oyster mushroom is easy to grow, fast yielding, planted on the small area of land, to earn return from investment. In addition mushroom can be grown all year and it provides employment to the farmers. After harvesting, the spent substrates are a good source of fertilizer which can be used to grow other vegetables. These strong points attracted small holder farmers in Rwanda to grow this crop. The use of agricultural wastes in the mushroom cultivation, play an important role in the protection of the environment (Ng'etich, Nyamangyoku, Rono, Niyokuri, Izamuhaye, 2013).

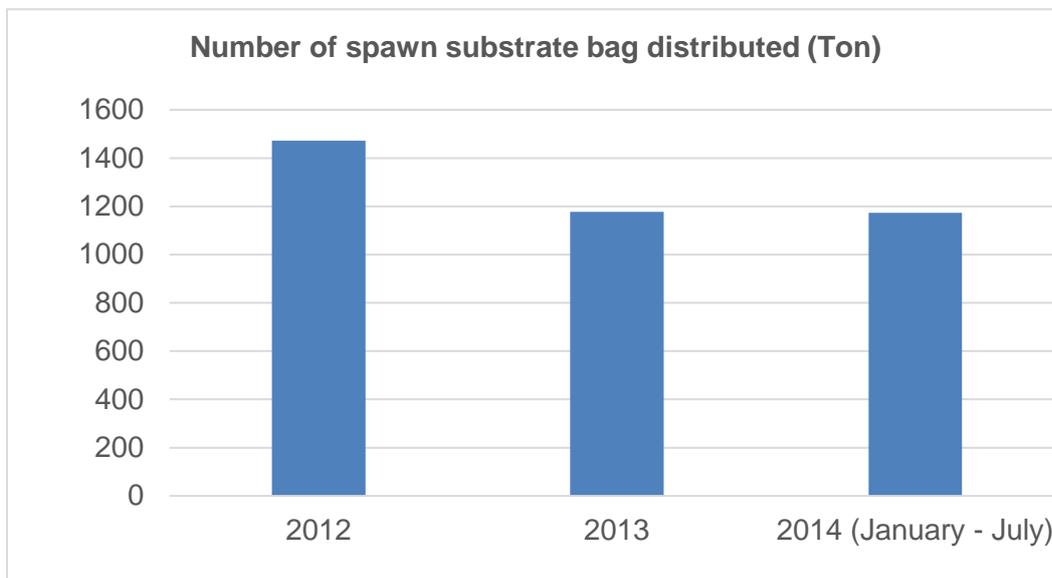
Since mushroom has been introduced, it developed slowly because the technology of the crop was new to the growers. Therefore, in collaboration with the government of Rwanda and Republic of China, Rwandan stakeholders were provided the training course on mushroom cultivation so that the production can be increased (RADA, 2011).

### 2.2.1. Trends of mushrooms in Rwanda

A study conducted in Rwanda Agricultural Development Authority on mushroom production, indicates that 64 bags of mushroom seed can be planted on one square meter of land in the shed. Depending on the agronomic practices, the yield of one bag is 400 grams and can be harvested three to four times within three months. The study indicated that one production cycle of mushroom in Rwanda is three months. An average output from one bag or one kg mushroom seed is 1 kg of mushrooms within three months. It means that 64 bags can yield 64 kg of mushrooms (RADA, 2011). From the above figures, the estimation of mushroom production in Rwanda is 1472.5 tons, 1176.8 tons, 1172.6 tons of mushroom respectively (C-RADTC Report, 2014).

Figure1 shows the number of mushroom spawn distributed to the seed multipliers in the whole country.

Figure 1: The trends of mushroom production in Rwanda



Source: (C-RADTC Report, 2014)

Similarly, the cultivation of oyster mushroom was identified as a potential source of income generation to the smallholder farmers in Kenya. Mushroom cultivation was introduced in 2003. Two types of mushrooms such as oyster and button mushrooms were cultivated in the country for the nutritive value and earning income by the farmers. But oyster mushroom was mostly dominated by the smallholder farmers due to the fact that its cultivation technique is easy to be applied by the farmers. The annual total production of the mushrooms is 500 tons (Gateri et al., 2009). A study conducted in Malaysia showed that more than 300 small farmers who were grouped into cooperatives and companies were able to produce about 2,400kg per day (Haimid, Rahim, Dardak, 2013).

Another study done in Bangladesh indicated that maximum of 300 bags are planted on 2m<sup>2</sup> in the shed and the weight of each bag is 700-750gr. It was found that the first harvest can be obtained seven days after planting and can last for four months. Each bag of spawn can yield 1.5 kg of mushroom (Zamil and Cadihlon, 2009). (Marshall and Nair, 2009) shows that in Tanzania, smallholder farmers benefited from the growing of oyster mushrooms. This study indicated that one production cycle of mushroom takes about 6 to 12 weeks and can be grown year-around. Tribrichu and Buykusenge (2009) also stated that about 4000 smallholders in Tanzania from 10 regions were able to produce 960 tons of fresh mushrooms per year.

### **2.2.2. Mushroom Production in Bugesera District**

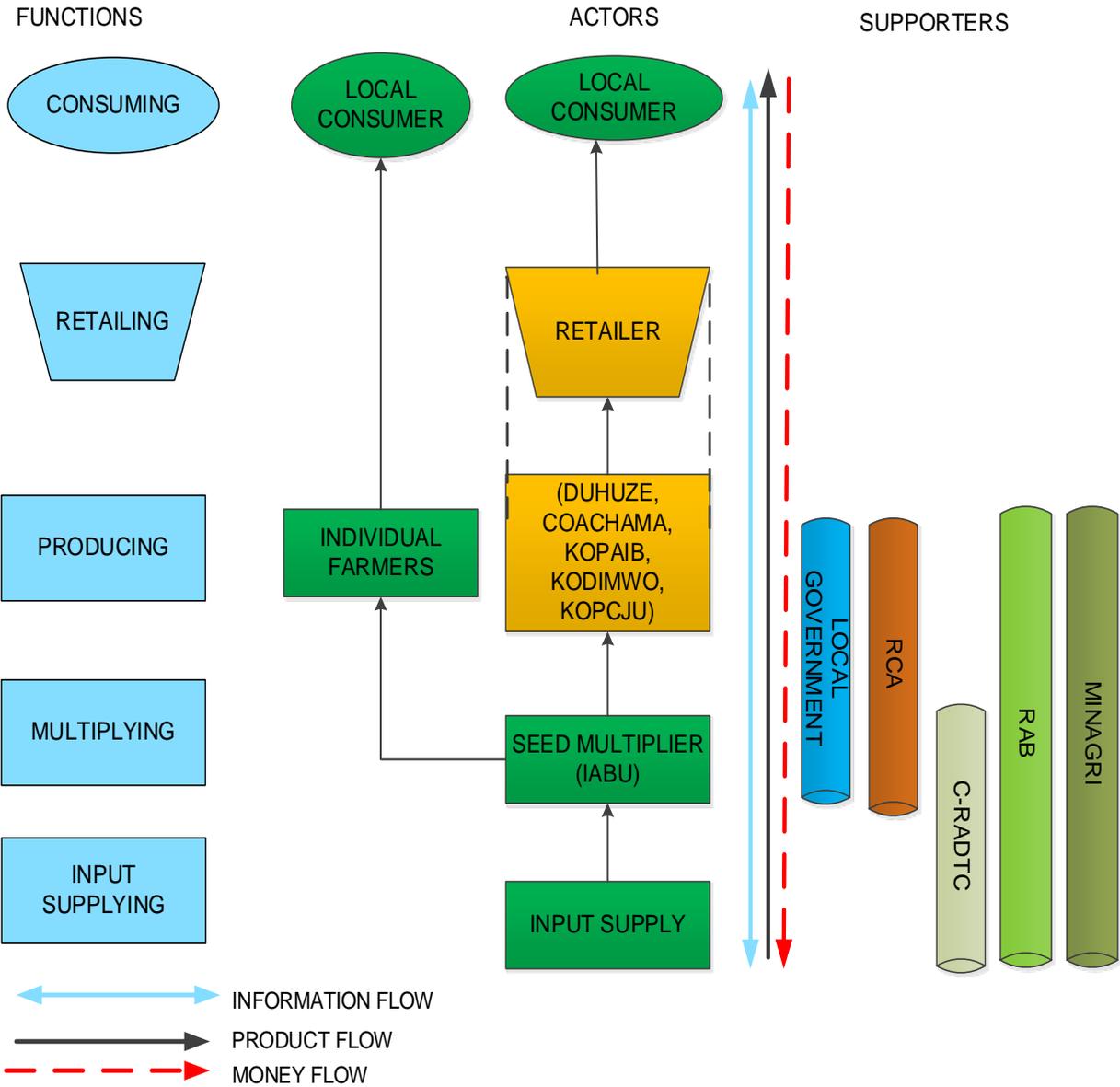
In Bugesera district, mushroom is grown by the smallholder farmers and mostly are in the cooperatives. At present, five cooperatives are involved in mushroom cultivation. These cooperatives are DUHUZE, COACHAMA, KOPAIB, KODIMWO and KOPCJU. Each cooperative has a legal personality from Rwanda Cooperative Agency. These cooperatives were organized into one cooperative union called “Bugesera Mushroom Cooperative Union” (IABU) who is in charge of seed multiplication and sells the mushroom tubes to its members. IABU was supported by the PADAB project which was a project of MINAGRI and it has been working in this region since 2007. The aim of the project was to improve agriculture production and it ended in December, 2013 (Kiptot, Kinuthia and Mutaganda, 2013). The annual production of mushroom in this region is unknown because there is no information available about it.

The figure 2 shows the mushroom value chain map in Bugesera district. The chain is composed of the chain actors and the chain supporters. Chain actors are input supplier (mushroom spawn), seed multiplier, producers both individual and cooperatives, local consumers. Mushroom spawn is provided by C-RATDC (China-Rwanda Technology Demonstration Center) which is a research center of Rwanda Agriculture Board. Individual farmers who live close to the factory buy minimum mushroom seed from IABU and grow mushrooms for their home consumption. Producers are the smallholder farmers who grow the mushrooms and sell to the local consumers in the district. They are five cooperatives who make up Bugesera Mushroom Cooperative Union (IABU).

The supporters of the chain are MINAGRI which offers financial support to the IABU, RAB provides technical assistance, supervision and coordinate the activity, RCA which offer legal personality, C-RTDC is a research center of RAB and it provides mushroom spawn, Local government is in charge of promoting the mushrooms production and consumption.

In this research the focus was on the marketing part of the mushrooms chain, and with emphasis on how to link the mushroom cooperative farmers (Duhuze) to the high value markets with my starting point being the producers in the mushroom chain. So the focus part is indicated on the figure below with the orange colour.

Figure 2: Mushroom value chain Map in Bugesera district



Source: Author's

### **2.3. Marketing of Mushroom**

Harvested mushrooms have a value on the markets when they are still fresh. To maintain the freshness, mushrooms should be delivered directly to the markets, refrigerated or processed after harvesting. To carry the mushrooms to the markets require special care to maintain its freshness, to avoid the damage and to protect them from contamination. This includes the use of crates which allow the air circulation, to cover the mushrooms to protect them being contaminated by the foreign matter like dust, flies and other insects (Marshall. and Nair, 2009). Given that mushrooms have a short shelf life and they are easily damaged, fresh mushrooms need special care in order to reach to the final consumer. It was found that considering these characteristics the farmers needed to handle this product carefully and have a well-planned marketing strategies so that the farmers can benefit from growing mushrooms. Marketing strategy is another important point to consider to bring the product from the farm to the consumers (Haimid, Rahim, Dardak, 2013).

#### **2.3.1 Marketing Strategies**

Marketing strategies refer to the marketing plan intended to achieve marketing objectives. The strategic plan is the detailed planning involving market research and then developing marketing mix to delight customers. Therefore, for an organization to be able to deliver its product to customers, it has to have a clear marketing objective. Market scanning is essential in order to gather information about the target markets. For a company can be able to enter to the market, there is a need to know other companies which are delivering the same product to the same target market. This involves having the knowledge of how they are working, their capacities to supply the product, quality of product and price (Marshall. and Nair, 2009).

#### **2.3.2 Marketing Mix**

Marketing mix refers to the Product, Price, Place and Promotion which is also called 4 P's of marketing. Product means that all characteristics, benefits that the customers can gain from consuming the product. Price refers to the method a company or an organization that is going to use in order to set the price of the product. A good price is the one which can help both sellers and buyers to get benefit, meaning that it will be a fair trade. Promotion refers to the ways of an organization or company which is going to use in order to popularize the product so that people can know more about the product. This includes advertising and publicity. Place indicates the location where the product is going to be sold (Haimid, Rahim, Dardak, 2013).

#### **2.3.3. Marketing Channels**

Recent study carried out on the marketing of oyster (*Pleurotus ostreatus*) mushrooms in the developing countries, identified four channels used to market the fresh mushrooms by the producers. Selling at the farm gate is the channel one where mushroom producers can sell directly to the consumers or to local markets. In this case consumers come at the farm to buy the product. Second channel identified in this study is retail market. Middlemen is the third channel who sell to the supermarkets, and supermarkets sell to the consumers. Lastly, producers can sell to the food services such as restaurants and hotels. These retailers prepare the fresh mushrooms into different dishes which are ready to eat and sell them to the end consumers. It was found that the consumers of cultivated mushrooms are mostly found in the urban area (Mabuza, Ortmann, Wale, 2013). The study indicated that farmers who sell the mushrooms at the farm gate was the one who get the higher value share followed to those who sell to the supermarkets.

Based on the research carried out in Kigali city about demand of mushroom in Rwanda, it was found that mushroom are highly valued by the hotels, restaurants, supermarkets, people living with HIV/AIDS. It was found that there is high market for the mushrooms in the city where 50 hotels in Kigali city demand over 260 kg per week that can be converted into one

ton per month (Tribrichu and Buykusenge, 2009). Imported canned mushrooms were also found on these markets. The suppliers of fresh mushrooms are small holder farmers from around the city and outside such as Gitarama and Butare and they could not meet the demand (Tribrichu and Buykusenge, 2009). Fresh mushroom produced in the country cost about 2,000-3,000 RWF per kg whereas imported mushroom cost 6,000 RWF per kg. In the rural areas of Rwanda the average price of fresh mushroom is 1,500 RWF per kg (Tribrichu and Buykusenge, 2009). The mushroom farmers sell their mushroom through two channels. There are farmers who sell to the food services (hotels, restaurants) and supermarkets. The growers also sell their produce to the local markets where people come to buy the mushroom from the farmers. At their farm gate, one kg of mushroom costs 1,000-1,200 RWF per kg (Tribrichu and Buykusenge, 2009). Marketing of fresh mushroom in Bugesera District, is organized by the producer themselves. That is why they are also the retailers in mushroom chain. After harvesting, the farmers sell the mushrooms along the street in small quantities (0.5 to 2 kg) to the consumers. Consumers of fresh mushroom in Bugesera district are the local people who live near to the producers (neighbours). Normally, mushroom growers have different ways of selling their fresh mushrooms. They can sell either directly to end users or to a retailer who later sells to end users, they may also sell to a processor who dries fresh mushrooms into dried or powder form. The processor also can sell directly to end user or to a retailer. The retailers of mushrooms can be a supermarket, restaurant, hotel or open market (Marshall and Nair, 2009). In Bugesera region, farmers sell their mushrooms directly to end users. In Uganda, small scale farmers have been benefiting by growing oyster mushroom by linking them to markets. They sold fresh and dried mushrooms where the price of one kilogram of fresh mushrooms is 1710 rwf (Nshemereirwe, 2004).

#### 2.3.4. Alternative Channels

A study conducted in Bangladesh, indicated that cultivated mushrooms are largely consumed by the urban working class and people with special diet preferences. It is was found that these customers buy the mushrooms mostly from the supermarkets. This channel was identified as an alternative channel for the farmers who grow the mushrooms in the rural areas. These farmers sell their mushrooms around the neighbourhood to avoid losses through spoilage. The farmers are paid low prices by the customers because they do not have information on the alternative markets. It was difficult for them to access the high price markets that is why they were more likely to sell their mushrooms at the farm gate (Mabuza et al., 2013). According to SNV (2010), establishment of the collection centres are another channel that can be used by the mushroom producers to markets their produce. KIT and IIRR (2008) found that small holder farmers have difficulty to participate on the markets. They rely on the markets which are closer to them because they do not know where they can find alternative markets and sometimes they lack the confidence to approach the potential buyers.

#### 2.3.5. Value Shares of the Actors in Value Chain

Value share is the percentage of the final retailer's price that each actor manages to capture. Added value is the difference between the revenue or selling price of the actor and the previous actor's revenue or price paid by the previous actor. It is amount of value that each actor in the chain adds. Below are the formula used to calculate the value shares and added value.

<p><b>Added value:</b> Revenue (selling price) - price paid by the previous actor or Revenue</p>
--

<p><b>Value share:</b> Value addedx100/Retailer price</p>
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KIT and IIRR (2008)

### **2. 3.6. Quality of the Mushrooms in Relation to the Market Requirements**

According to Gateri.M (2009) quality of the mushrooms depend on the quality of spawn. To sell the mushrooms it requires to produce a better quality which is in line with the demand of the markets. The good quality of mushrooms depends on quality of spawn. Inadequate skills in production of the farmers limit them in producing better quality. Fardah and Cadilhon (2009) indicated that the buyers of mushrooms who in turn to sell to consumers are more concerned with the quality of mushroom so that they can satisfy their customers. The most important quality attributes of mushrooms to the buyer is hygiene, trimming and packaging. In addition to these, Narendra and Hareesh (2010), indicated that in order for mushroom to be acceptable by the market, colour and shape of mushroom is important consideration. Intermediary markets such as supermarkets require mushrooms that has a cap, stem because it needs also to sell to the end user.

### **2.3.7. Constraints faced by the farmers to enter to the markets**

The most important constraints that are faced by the farmers in the mushroom production in Rwanda, are the lack of access to the markets, insufficiency extension services to small holder farmers, high cost of input (mushroom spawn), lack of quality control systems inadequate hygiene practices and poor postharvest handling practices (Tribrichu and Buykusenge, 2009).

There are many factors that hamper farmers reaching the markets. In Mexico, the lack of marketing strategy in place was the limitation to the development of the mushroom industry (Carrera.M, Nava.D, Sobal.M, Bonilla.M and Mayett.Y, 2005). Inadequate infrastructure leads to the farmers not reaching the market. For instance, the farmers who are in the remote areas, it is difficult to bring their produce to the markets due to the lack of roads (KIT and GRA, 2013). Lack of market information also affects the farmers in the marketing of their produce. Farmers need to have access to information related to the price, quantity, quality requirements demanded by the markets so that they can market their produces. The production technology is another barrier to the farmers that is why extension services are also important to the farmers so that they can produce a good quality. Therefore, supportive policies, better roads, developed market information and established quality standards are crucial in order to reduce the barriers that affect the farmers in the marketing of their produce (KIT and GRA, 2013).

Mabuza et al. (2013) found that to solve the challenges faced by the farmers in the marketing of mushroom, is to organize the farmers into groups such as cooperatives or associations. This will enable farmers to market their produce through collective marketing. Also the transaction cost will be reduced because farmers will no longer take their harvested products to distant markets. This gives the farmers bargaining power in negotiating and selling of their produce.

A study carried out in Kenya on the markets showed that farmers faced various constraints in the marketing of oyster mushrooms. The most important were having inadequate skills in the production, marketing, information to markets and lack of entrepreneurial skills. Next to this was the lack of access on the good quality of spawn. It was found that mushroom was new industry and there was a shortage of extension officers who have knowledge in this field. In addition to these, consumers were not aware about cultivated mushrooms because they were familiar with those which come from the wild. This caused to them to think that cultivated mushroom are inedible, it was also found that mushroom were expensive and this resulted in the mushrooms consumed only by the high income people (Gateri, 2009).

## CHAPTER 3. METHODOLOGY AND STRATEGY

This chapter explains the methodologies and strategies used to accomplish the research. The first section of this chapter which includes 3.1; 3.2 and 3.3 describes the climate of Rwanda, study site and research conceptual framework. The second section describes study design, methods and strategies of data collection, sampling methods and methods of data analysis. The type of the research was a case study. Two strategies such as survey using structured questionnaire and interview using a checklist were used to collect the data from the field work. From the survey, both quantitative and qualitative data were obtained whereas qualitative data were obtained from interviews.

### 3.1. Climate of Rwanda

The climate of Rwanda is tropical temperate due to its high altitude that average around 2,000 m. Rwanda is divided into three regions and each region has its climatic conditions (UNEPF, 2011). These three regions together with their climatic conditions are summarized in the table below.

**Table 1: Summary of climatic condition in three regions of Rwanda**

Parameters	High altitude (1,800-3,000 m)	Central plateau (1,500-1,800 m)	Eastern plateau (1,250-1,500 m)
Rainfall (mm)	1,300-2,000	1,200-1,400	600-1,400
Temperature (°C)	16-17	18-21	20-24
Evapotranspiration	1,000-1,300	1,300-1,400	1,400-1,700
Relative humidity (%)	80-95	70-80	50-70
Insolation (hrs/day)	5-6	5-6	6-6.5
Wind (km/hr)	7-8	6-7	4-6

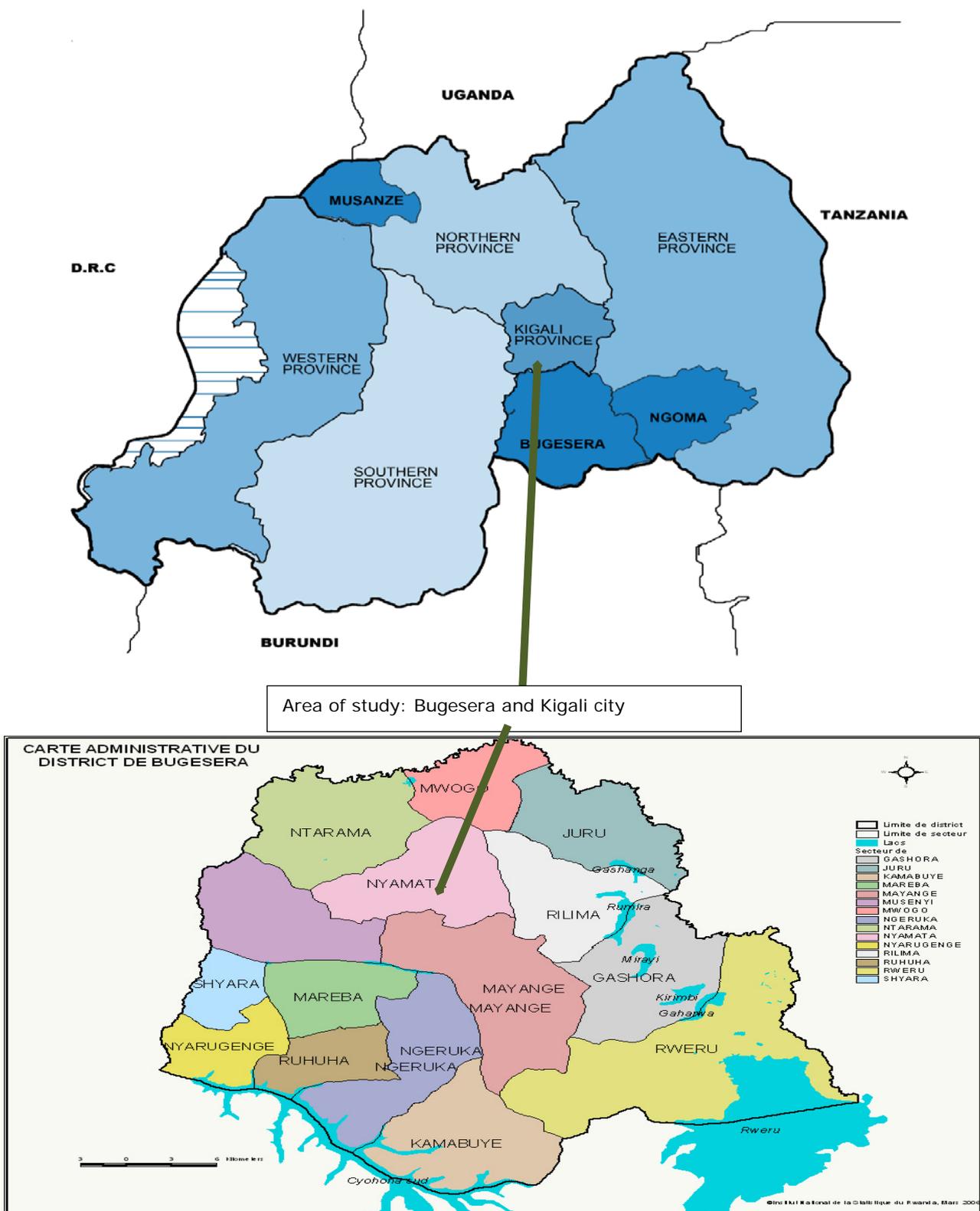
Source: UNEFP, 2011

### 3.2. Study Area

The study was conducted in Bugesera District specifically in Nyamata Cell and its surrounding areas (Kigali city). Nyamata Sector is where the Duhuze mushroom cooperative is located as well as the farmers. Kigali City is the capital of Rwanda and is composed of Nyarugenge, Kicukiro and Gasabo Districts (Bugesera, 2013). Kigali City was chosen as an area of study in relation to found out the alternative channels for the Duhuze mushroom cooperative.

Bugesera is one of the seven District composed of Eastern province of Rwanda. It borders with the Kigali City (Capital City) in the North and the Republic of Burundi in the South. This region is favourable for trading due to its borders. Bugesera covers a total surface area of 1337 km<sup>2</sup> which arable land is 91,930.34 ha with the average size of land cultivated per household is 0.59 Ha. The district is composed of 15 sectors, 72 cells and 581 villages. Nyamata is the one sector which has a biggest trading center amongst seven trading centers in the region. The district is characterized by dry climate the temperature varying between 20 and 30 ° C with an average ranging between 26 and 29 °C. Agriculture is the main economy of the district where 77.8% of the population involved in livestock rearing and crop farming on small parcels (Bugesera District, 2013). Agriculture is the main source of income where it offers 46% of households' income to the people in the Bugesera district (NSR, 2012).

Figure 3: Study area



Source: [www.bugesera.district.gov.rw](http://www.bugesera.district.gov.rw)

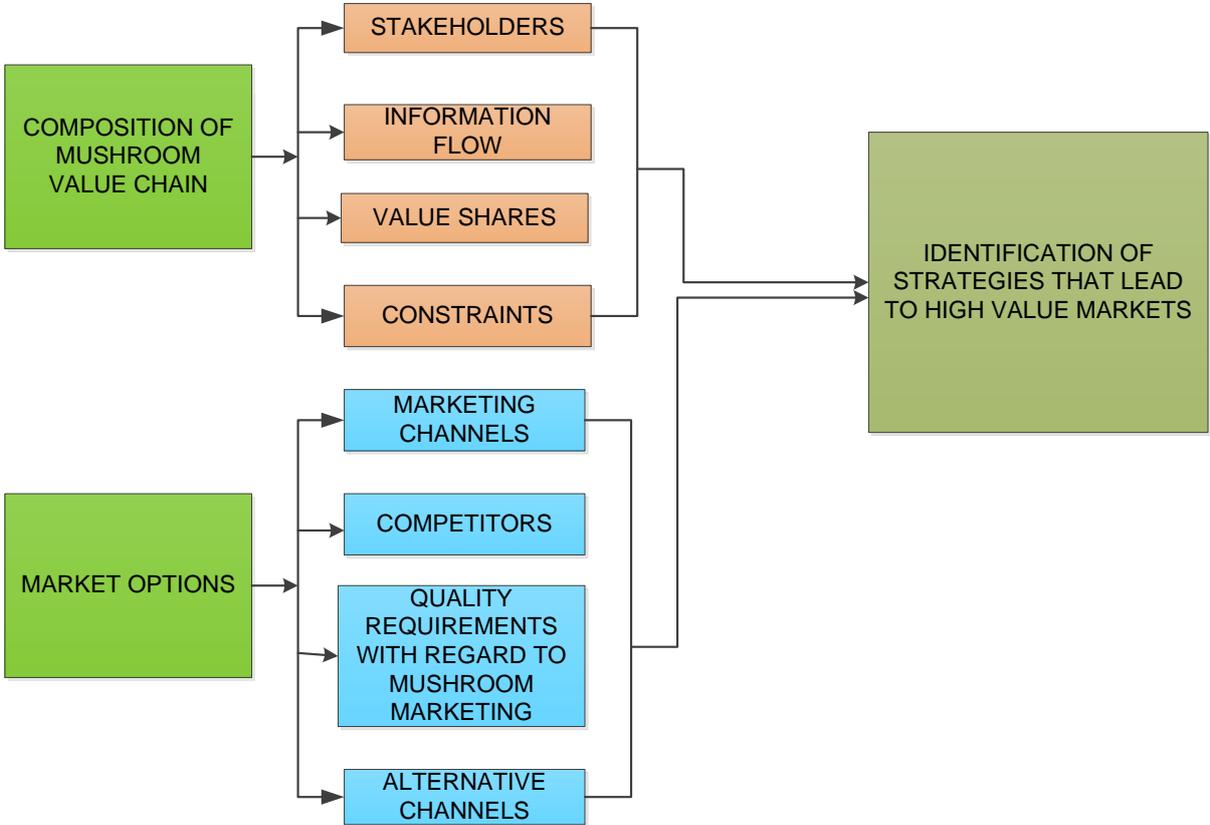
### 3.3. Research Conceptual Framework

The study was adopted the conceptual framework represented in the figure 4. In this framework two core concepts of the research was elaborated. Those concepts are composition of mushroom value chain and the market options and each concept has its components. Therefore, the study was concentrated on the following aspect of the value chain: stakeholders who are in the mushroom chain in the area of study, how information does it flow in the chain, the value share of different actors in the mushroom chain and constraints encountered. Furthermore, the study was focused on the current marketing channels, competitors, quality requirements in regard to the mushroom marketing and alternative channels. By studying all these concepts was enabled the researcher to identify the strategies that lead the farmers to high value markets as it is stated in the figure 4. Hence, the following paragraph provides the explanation of the research framework which is presented in the figure 4

The higher value share of actors depends on the way the chain is constructed (Hughes, Shahi, Pulkki, 2014): different categories of stakeholders who composed the chain and their capability to interact each other, the way information is following (upstream and downstream) and the value shares within the chain (Miller and Jones, 2010). Some external factors from outside the chain also influence the higher value share that require the way market is organised (Gebremichael and Raro, 2014) through marketing channels, the capacity of the competitors, the quality requirement of the product (KIT and IIRR, 2008) and the different alternative channels that can be used to identify the strategies lead to high value markets (IFAD, 2010).

Figure 4 indicates the research conceptual framework flowed in order to get an answer of the research questions as well as to reach to the objective of the research

Figure 4: Conceptual Framework



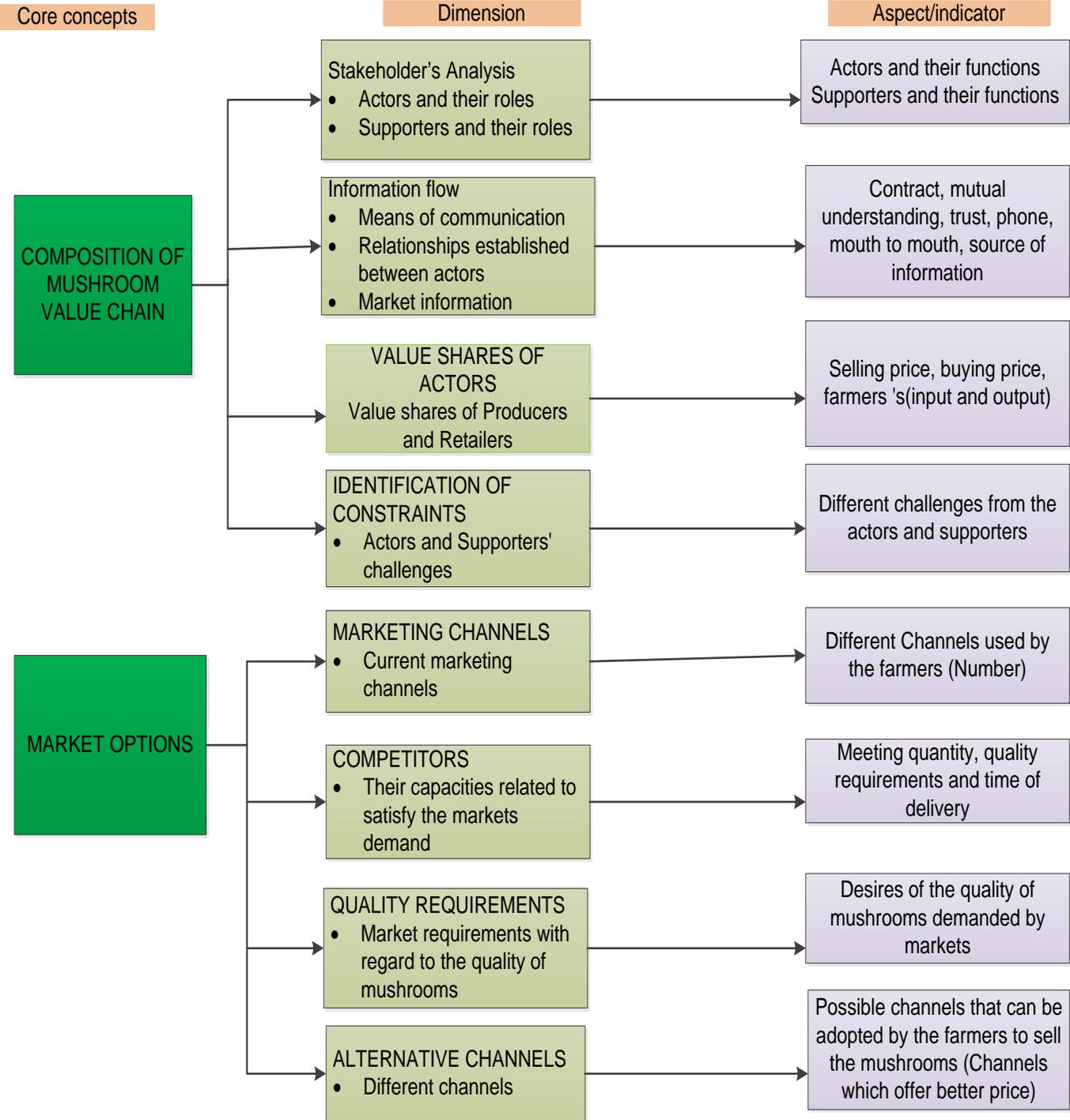
Source: Own compilation

### **3.3.1. Operationalization of the research conceptual framework**

Duhuze mushroom cooperative 'strategies is identified firstly on stakeholder analysis where the actor and supporters were stated through their functions. Secondly, the flow of information is necessary by determining the means of communication such mobile phone, mouth to mouth, the relationship established between actors like contract, mutual understanding. Market information is collected by looking the source of information. Thirdly, the values share of actors is determine by the selling price, buying price and farmers 'input and output. The constraints faced by the chain actors and chain supporters was be determine by analysing the chain to see where obstacles are in the chain. The above aspects determine the composition of mushroom value chain and it is not complete to determine the strategies that are needed to reach to high value markets

Hence the study need the market options in order to reach the research objective. The marketing channels were determined by enumerating current mushroom's channels. In order to analyse the capacities of competitors, the study focused on their ability to meet the quality, quality requirement and time of delivery. The quality requirements was determined, by looking the desires of the mushroom buyers in relation to the quality. In order to know the alternative channels, the possible channels that can be adopted by the farmers or appropriate to the farmers were determined by choosing the identifiable channels the one which lead to the high value market. The above information is summarised on the figure 5.

Figure 5: Operationalization of the Conceptual Framework

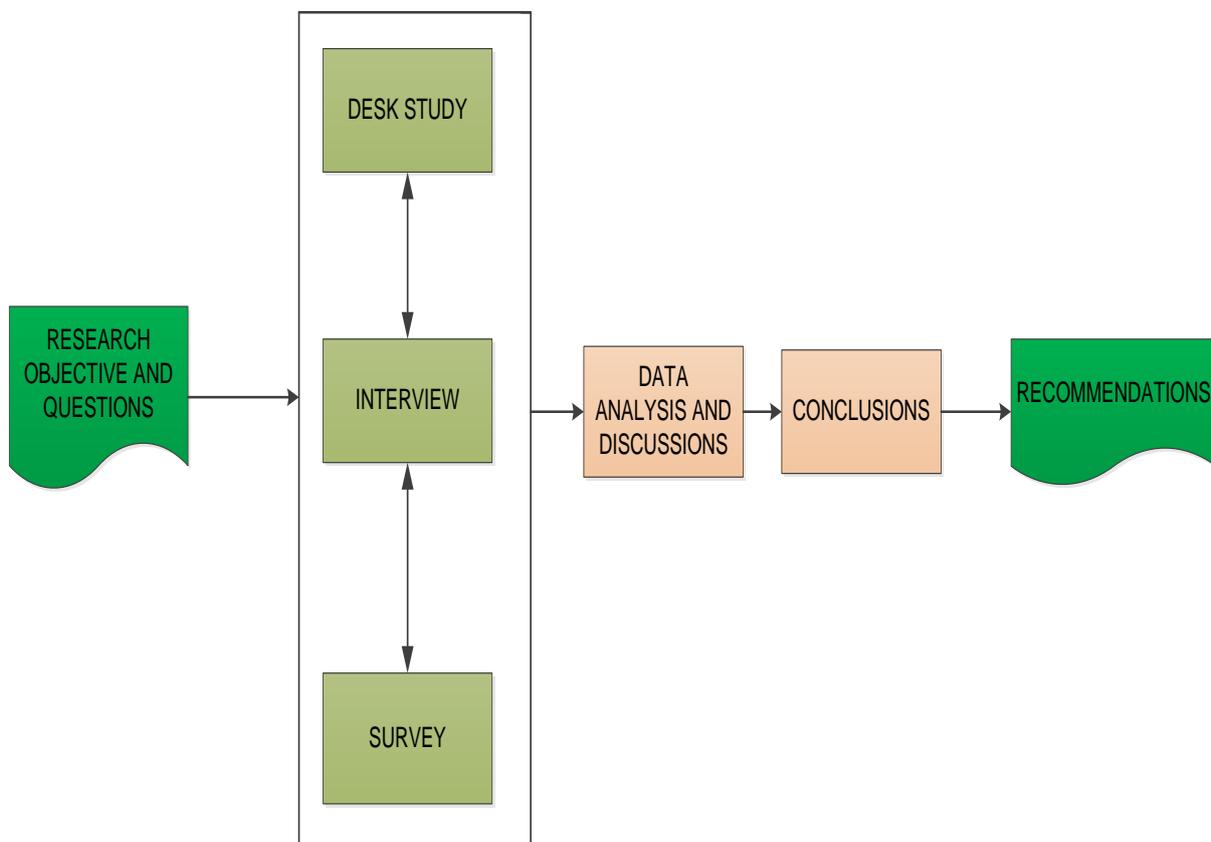


Source: Own compilation

### 3.4. Study Design

Desk study followed by an interview and survey are the strategies which were used to perform the research. Data was collected through a case study and was analysed based on both quantitative and qualitative approach. A desk research and field research are the main parts of this research. Therefore, to realise the research objective and to answer the research questions, data were collected through to the following parts presented on the figure 6.

Figure 6: Study design



Source: Author's

#### 3.4.1. Desk Research

Is the first stage of the research whereby information were gathered by reviewing material such as specialised journals, scientific books, published books, WUR digital library, internet web sites and local reports. Therefore, by reviewing above mentioned materials the secondary data were obtained. This stage is called Literature review.

### **3.4.2. Field Research**

This is the second stage of the research where the primary data were collected through the field work. This part of the research was involved two strategies which were used to collect the data:

#### **Survey**

A survey is the first strategy that was used to conduct this research. A survey was conducted on the all twenty farmers of the Duhuze mushroom cooperative. Each farmer within Duhuze cooperative is allowed to grow mushrooms and sell his/her production individually. He/she is allowed to use his /her marketing strategies to sell the mushrooms. A written questionnaire was used to gather information from the farmers of Duhuze cooperative. Every farmer was questioned individually. The questionnaire was contained both close and open ended questions. From the survey, both qualitative and quantitative data were obtained and processed by using descriptive Statistical Package for the Social for the Sciences (SPSS).

#### **Interview**

An interview is the second strategy that was used to collect data. This strategy used a checklist as a guide to obtain data from RAB (Rwanda Agriculture Board), RCA (Rwanda Cooperative Agency), MINICOM (Ministry of Trade and Industry), NAEB (Rwanda National Export Development Board), RMPO (Rwanda Mushroom Producers Organisation), Local government and two processors. Furthermore, interview was used to get data from the mushroom buyers. Therefore, four Hotels, four restaurants, one open market, two processors and two supermarkets were interviewed. All these buyers are located in Kigali city except one hotel and open market are located in Bugesera district. After each interview, a transcript was done to avoid forgetting the answers. Quantitative data were collected in order to know the gravity of the problem whereas qualitative helped me to know the root of the problem.

#### **Observation**

Observation also was used in this research specifically on the supermarkets, open markets and farmers. On the markets such as supermarkets, hotels, restaurants the selling prices of the mushrooms, name of the varieties and the country of origin were observed. Observation was used to see the means used to carry the mushrooms by the farmers to their customers such as the transparent buckets. The mushroom shed where the farmers are growing the mushrooms and how the lack of access to the market resulted the loss to farmers were also observed.

The table below shows the research strategies which will be used in order to come up with the findings.

**Table 2: A summary of research design and strategies**

<b>MAIN QUESTION</b>	<b>SUBQUESTIONS</b>	<b>KEYWORDS</b>	<b>SOURCE OF INFORMATION</b>	<b>RESEARCH METHODS</b>
1	1.1	Stakeholders involved in the mushroom chain and roles	Key informants -Ministry of Trade and Industry, Rwanda Mushroom Producers Organisation -Rwanda Cooperative Agency -Rwanda Agriculture Board (RAB) -Person in charge of cooperative at the Sector level (Bugesera)  -Duhuze mushroom cooperative farmers	-Interviews- Check list  Desk study  -survey (structured- Questionnaire)
1	1.2	Information flow in the mushroom chain	Article in Journals, Books Duhuze mushroom cooperative farmers, hotels, restaurants, supermarkets  Key informants	-Desk study -survey (structured- Questionnaire)  -Interviews- Check list
1	1.3	Value shares of the actors in the chain	Books, Article in Journals, Duhuze cooperative farmers , hotels, restaurants and supermarkets, open markets, seed multipliers, processors	-Desk study -Survey (structured- Questionnaire) -Interviews- Check list
1	1.4	Constraints encountered	Duhuze Mushroom cooperative Farmers	- Desk study -Surveys (structured- Questionnaire)
2	2.1	Mushroom marketing channels , current mushroom channels	Duhuze mushroom cooperative farmers	-Survey (structured- Questionnaire)
2	2.2	Competitors of Duhuze mushroom cooperative	Duhuze mushroom cooperative farmers,  Hotels, restaurants and supermarkets were be asked on duhuze competitor	-Surveys (structured Questionnaire)  -Interviews- Check list
2	2.3	Quality requirements with regard to	Books, Article in Journals,  Duhuze Mushroom cooperative Farmers	-Desk study  -Survey

		mushroom marketing	hotels, supermarkets, restaurants,	(structured-Questionnaire)  -Interviews-Checklist
2	2.4	Challenges encountered in the mushroom chain	Duhuze Mushroom cooperative Farmers, Stakeholders	-Surveys (structured Questionnaire)  -Interviews-Check list
2	2.5	Alternative channels to improve farmers' income	Articles in Journal, Books,  Duhuze cooperative mushroom farmers  hotels, supermarkets, restaurants, processors	-Desk study  -Survey ((structured Questionnaire))  -Interview (Checklist)

Source: Own compilation

### 3.4.3. Sampling Methods

The respondents and key informants in the area of study were sampled purposively. This method also called a judgemental sample involves the selection based on the knowledge of the population or the purpose of the study. In other words the population were selected because of some characteristics. As I said earlier, each farmer within Duhuze mushroom cooperative is allowed to grow mushroom and sell his/her production. Therefore, all farmers of Duhuze cooperative were included in this research. Hence, all 20 farmers of this cooperative were interviewed using structured questionnaire.

Purposive sampling was used to select the retailers of the mushrooms such hotels, restaurants, open market and supermarkets. This method was chosen in order to see other alternative channels that can be used to sell the mushrooms by the farmers. Therefore, the mushrooms sellers, were selected based on the following characteristics: Being in the area of study, being medium or high class, convenient and easy to reach. Basing on the above characteristics, one hotels was selected from Bugesera District whereas the remaining were selected from Kigali City. So in total 10 mushrooms retailers were involved in this research.

The purposive sampling method was also applied to the selection of the key informants such as the Ministry of Trade and Industry, Rwanda Cooperative Agency, Local government at the sector level in Bugesera region, Rwanda National Agriculture Export Board and Rwanda Mushroom Producers Organization.

A snowball sampling was used to select the processors who are located in the study area specifically in Kigali city because there is no processor in Bugesera district. So, 2 processors such as PPC Rengera ubuzima and BN Producers were interviewed.

### 3.5. Data Analysis

By conducting a survey and interviews, the following four types of findings were obtained and analysed. Data from the farmers were analysed based on the quantitative data and qualitative data. The quantitative data from the survey were processed using descriptive Statistical Package for the Social (SPSS). Qualitative data also from the survey were categorized and processed by using SPSS. Findings obtain from interviews with the key informants, buyers of mushrooms, and processors were analysed based on the qualitative data. These data were analysed by using Chain map and Stakeholder matrix. This tool helped to know function of every key informant in the chain. Data from the buyers of mushroom were analysed by categorizing the data and compare to what literature says.

A SWOT which is an analytical tool for analysis of the internal and external factors such as strengths, weaknesses, opportunity and threats of an organization. Therefore, basing on the analysis of all findings, this tool was used to see where Duhuze cooperative farmers have strengths, weaknesses, opportunities and threats. Basing on the identified weaknesses for the farmers in mainstreaming of marketing of mushrooms, was helped the researcher to see what measures should be taken in order to lessen them. In other words, the strategies to link these farmers to high value markets were identified

## **CHAPTER 4. RESULTS**

This chapter describes the findings from the research that was carried out on the Duhuze Mushroom Farmers' Cooperative. It is located in Nyamata cell which is one of the 15 cells composed of Bugesera district which is located in the Eastern Province of Rwanda.

Interviews were conducted on the buyers of mushroom in Bugesera district specifically in Nyamata cell. The seller of vegetables in Nyamata open market and the Manager of Lapalast rock hotel were interviewed. In Kigali city, two hotels, four restaurants, two supermarkets, two processors were interviewed in looking for alternative channels for the Duhuze cooperative farmers. The interviews were done face to face.

Interviews were also conducted on the different institutions and Ministry which have been expected to be the supporters of the mushroom chain. This includes the Ministry of Trade and Industry, Rwanda Agriculture Board, National Agricultural Exports Development Board, Rwanda Mushroom Producers Organization, Rwanda Cooperative Agency and the Local government at the sector level were interviewed.

### **4.1. Results from the survey and Interviews**

#### **4.1.1. Stakeholders involved in mushroom value chain**

The study found that mushroom chain in Bugesera district is composed of: the seed multiplier known as IABU, twenty farmers who are members of the Duhuze cooperative are the producers, the retailers which include one open market seller in Nyamata and Lapalast hotel. The farmers act as consumers as they consume the unsold mushrooms. The producers in this chain also play a role of retailing directly to their neighbours for home consumption. Some consumers buy cooked mushroom from Lapalast Rock hotel (processing and retailing). Finally some consumers buy fresh mushroom at Local market in Nyamata.

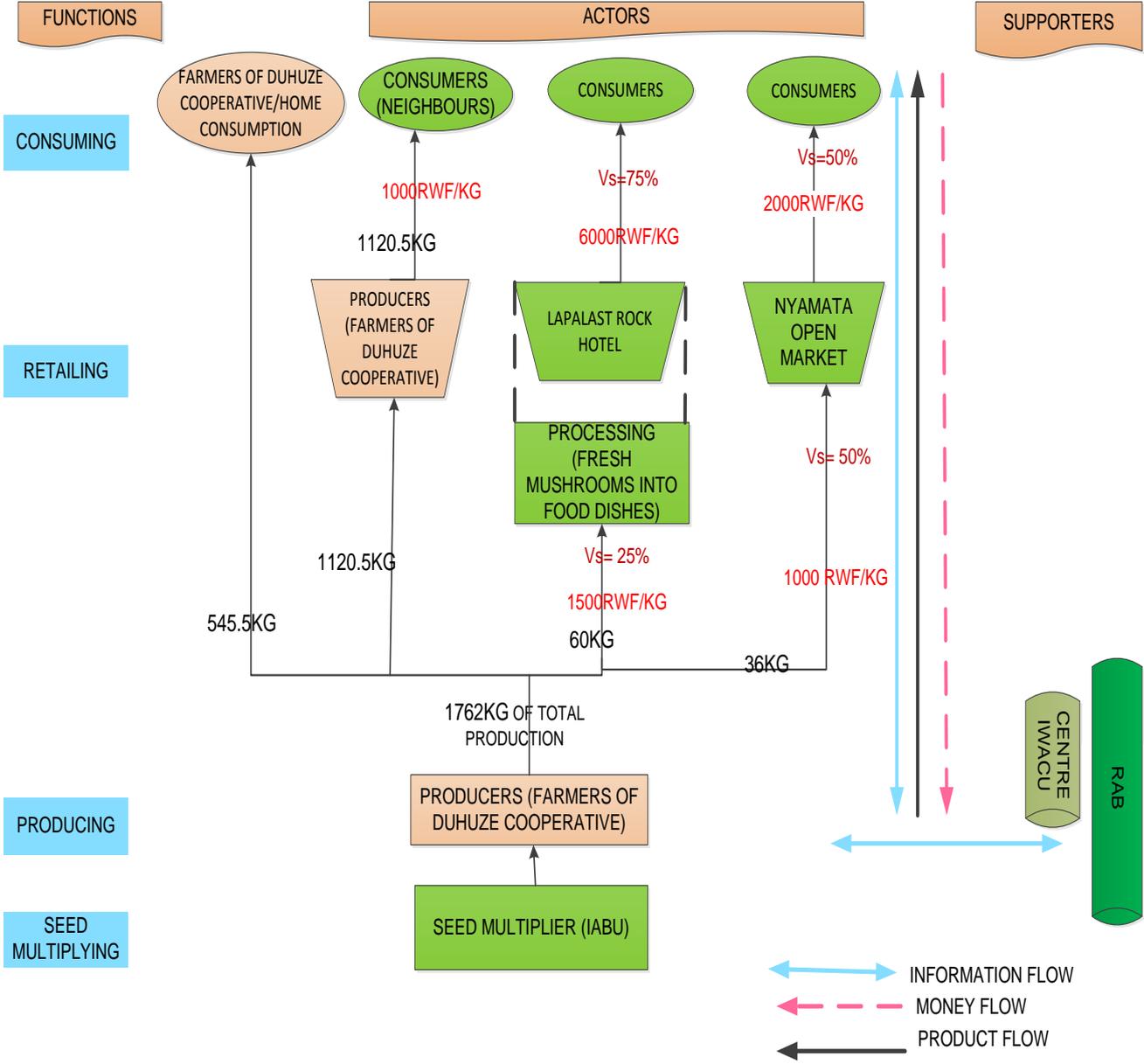
Rwanda Agriculture Board (RAB) and Centre IWACU are the supporters in the chain. RAB provide the training on mushroom cultivation. According to the farmers, Centre IWACU is a new supporter that started by providing training on entrepreneurial skills such as looking for market and how to seek the financial support from the financial institutions (Refer to table 3).

The results show that the total production per one production cycle is 1762Kg. This volume was obtained by making the total yield obtained by all farmers. An average of 545.5 Kg of mushroom are consumed by the farmers themselves. The total sales is 1216.5kg of mushrooms which are sold in the following channels. 1120.5kg, 60Kg and 36Kg are sold to their neighbour, hotel and open market respectively.

In terms of current channels used by the farmers of Duhuze cooperative, results show that majority of the producers (90%) sell the mushrooms to their neighbours. Only one farmer sells the mushrooms to Lapalast Rock hotel which prepares different dishes and sell them to the consumers. This farmer sells 60 kg of the total production by all farmers to hotel. Another farmer sells 36kg of total production to a retailer in the open market who in turn sells to the consumers. Both the hotel and the open market are located in Nyamata cell. This means that the farmers only focus on selling to their neighbours. These findings are presented in figure 7. The functions of each of the actors and supporters in the chain are explained in the table 3 in detail.

The figure 7 represents the chain map of Duhuze Mushroom Farmers' Cooperative is acting.

Figure 7: Chain Map in which Duhuze Mushroom Cooperative play role



Source: Own compilation

## Supporters of the Chain

The main supporters of the chain are RAB and Centre Iwacu. Centre Iwacu is non-governmental organization which contributes to the improvement of rural areas by providing capacity building to the cooperative. It trained the twenty farmers on marketing aspect of entrepreneurial skills. RAB trained the twenty farmers on mushroom cultivation.

### 4.1.2. Function of the Actors and Supporters

Table 3 shows the actors and supporters and who are involved in mushroom chain of Duhuze mushroom cooperative farmers and their functions.

**Table 3: Functions of the actors and supporters**

ACTORS	FUNCTIONS
Seed multiplier	Seed multiplier in this chain is Bugesera Mushroom cooperative Union (IABU). It Multipliers mushroom seed and sells to the producers who are its members and other interested growers.
Producers	They are smallholder farmers who are members of Duhuze cooperative, one of cooperatives that make up IABU. They produce and sell mushrooms to institutional and domestic consumers.
Retailers	<p>They are composed of hotel, open market and the producers themselves:</p> <ul style="list-style-type: none"> <li>• Hotel buys mushrooms from the producers and prepares into different dishes and sells to end users. and sell the mushrooms to the consumer/end user</li> <li>• Open market buys the mushrooms from the producers and sells to the customers for final consumption.</li> <li>• The producers themselves sell their mushrooms to their neighbours who are the end users.</li> </ul>
Consumers	<p>They are of the end user of the mushrooms. They are composed of three groups:</p> <ul style="list-style-type: none"> <li>• The first group buys the mushroom from the producers and made some preparation for final consumption. These include the people who live near to the producers and the workers who are working in the offices in Nyamata city. The second group buys the mushrooms from hotel which is ready to eat. Last group buys the mushrooms from open market for final use after making some preparation.</li> </ul>
<b>SUPPORTERS</b>	
Rwanda Agriculture Board (RAB)	RAB is in charge of implementing of agriculture in whole country. In the mushroom chain, It provides extension services to the producers. These include trainings on mushroom growing, mushroom seed multiplication and supervision. It also provides mushroom spawn to the seed multipliers through its

	research center called C-RATDC (China-Rwanda Technology Demonstration Center Rwanda).
Centre Iwacu	Centre Iwacu is non-governmental organization which contributes to the improvement of rural areas by providing capacity building to the cooperative. It starts to provide trainings to the Duhuze cooperative farmers on entrepreneurial skills, record keeping, looking for market and how to seek the financial support from the financial institutions. It also links the Duhuze cooperative farmers to other supporter who provided financial support to the cooperative

Source: Own compilation

Interviews were also conducted on the expected chain supporters in order to see if there are services they offer to the mushroom chain. As a means of identifying alternative marketing channels, the researcher had to interview these organisations; MINICOM, RAB, RCA, RMPO, NAEB, and the Local government.

RAB and RMPO are the only institutions that offer services to the smallholder farmers who are in the mushroom growing. However, RMPO does not offer any service to the Duhuze cooperative. The Researcher found that in order for the cooperative to be offered services by RMPO, the requirements is to be its member, being legalised cooperative or company in mushroom sector. The services offered by RCA are too general because are related to the leadership of the cooperative, management, conflict resolution as well as providing of legal personality.

Though MINICOM and NAEB and RCA play a role in linking the processors to market, they do not offer services to the mushroom smallholder's farmers. They consider mushroom sector as small sector and its production is still low, the farmers are able to search the markets themselves. Local government said that it provides training to the farmers on how to search market by using e-soko system, linking farmers to the buyers. However, these services are not known by the farmers because 95% of the farmers said that no one provides to them market information.

MINICOM is in charge to intervene in case there is a surplus of mushrooms or any complaints from the growers. Details of interviews can be seen on Appendix 14

#### 4.1.2. Information Flow

The study showed that information was shared downstream and upstream amongst actors in the chain. Information shared amongst the farmers is about the growing of the mushrooms. Information-shared amongst the farmers and retailers is about selling and buying of mushrooms. Information shared between retailers is also about selling and buying of mushrooms. Information shared among the retailers and consumers is selling and buying where the customers seek information on quality, quantity and price.

Information-shared among farmers and RAB as supporters concerns cultivating mushroom such as growing the mushrooms, mushroom seed multiplication. Centre iwacu and farmers share information on entrepreneurial skills. Results showed that the main means of communication between farmers and the customers was through the mobile phone and verbal communication.

From the results, the relationship between actors was based on trust. The greater number of the farmers indicated that the relationship with their customers was based on trust. Only one farmer who sells to the hotel has a formal relationship with the customer. While a relationship

based on trust portrays good relations between the actors involved, a contract between buyer and seller means a more permanent relationship.

Market information refers to access to different opportunities of selling their products. Important aspects of market information is about where to sell produce, the markets requirements, market prices and how to reach the buyers. The farmers were asked who provides information to them related to the markets. All the farmers indicated that there is no one who provides them with market information. The implication is that most farmers lack access to market information which is critical for accessing good markets for their produce.

**4.1.3. Value Share of the Actors**  
**Selling Price of the Mushroom by the Farmers**

In order to know the price that farmers sell per one kilogram of mushrooms, each farmer was asked her/his selling price. From the results, (95%) of the farmers selling price for one kilogram of mushroom is 1000 rwf and with only one who sells at 1500 rwf per kilogram of mushroom. Table 4 shows the selling price.

**Table 4: Selling price**

Selling price	N° of farmers	Percentage
1000	19	95
1500	1	5
<b>Total</b>	<b>20</b>	<b>100</b>

Source: Own compilation

The value share were obtained by calculating the variable costs per one production cycle. The variable costs are including the following costs: The calculation of the variable costs covered the flowing costs:

Cost of the mushroom seed and transport, cost of water for irrigation, cost of plastic film to cover the mushroom seed in the shed, cost of renting the land, cost of the labor. Mushroom shed was not calculated as fixed cost. Only the cost for the renovation of the shed was considered because it need to be renewable each production cycle.

Mushroom shed which should be calculated as fixed cost was included in the variable cost because the material for building is renewable per production cycle. In order to obtain the cost of production of 1kg of mushrooms, researcher calculate the average of different cost of mushroom. More details on the calculation of variable costs are available on Appendix 5.

Table 5 represents the value share of the farmer who sells the mushrooms to open market.

**Table 5: Value share for the farmers who selling to Nyamata open market**

<b>Chain actors</b>	<b>Variable costs</b>	<b>Revenue</b> Selling price	<b>Gross income</b> Revenue-Costs	<b>Added value</b> Revenue-Previous actor's revenue	<b>Gross margin</b> Gross incomex100/ Revenue	<b>Value share</b> Added value x100/Retailer price
<b>Farmer</b>	900	1 000	100	1000	10%	<b>50%</b>
<b>Open market</b>	1200	2 000	800.0	1000	40%	<b>50%</b>

Source: owner compilation

Results from the calculations shows the value share is the same for both farmer and open market. It does not mean that they get the same profit. It is because the added value is equal for both. Comparing the activities done by the retailer and farmer, the retailer is only involved in packaging the product and selling although the farmers cultivate (Appendix 5) and transport the mushroom and has a higher variable cost compared to the open market. Also comparing to the gross income farmer has less percentage. The farmers should have high value share than the retailer because the added value of the farmers is high compare to the added value of the retailer.

**Table 6: Value share for the farmer who sells to the hotel**

<b>Chain actors</b>	<b>Variable costs</b>	<b>Revenue</b> Selling price	<b>Gross income</b> Revenue-Costs	<b>Added value</b> Revenue-Previous actor's revenue	<b>Gross margin</b> Gross incomex100/ Revenue	<b>Value share</b> Added value x100/Retailer price
<b>Farmer</b>	900	1 500	600	1 500	40%	<b>25%</b>
<b>Hotel</b>	3 000	6 000	3 000	4 500	50%	<b>75%</b>

Source: own compilation

The table 6 shows that the value share differ from farmer to hotel. By comparing the add value of the retailer is high in sense it is involved in mushroom preparation (see Appendix 6) where the farmers cultivate and transport the mushroom. The hotel should has a higher value share because it is involving in the processing of the mushrooms.

For the farmers who are selling to their neighbours the value share was not calculated because the neighbour buy the mushrooms for home consumption.

From the table which is presented in the Appendix 5, the average of the variable cost was calculated and it is used to calculate value shares for the farmers.

#### 4.1.4. Constraints encountered in the mushroom value chain

The study found that the farmers are the one who faced various constraints in the mushroom value chain. The most important were inadequate access on market; there was no linkages with the potential buyers such as hotels, restaurants and supermarkets. Farmers did not have access on market information. These reasons led to the majority of farmers to sell the mushrooms to their neighbours. The farmers lack of the market organisation. They sell mushrooms without combining the power. Each farmer operate in her/his own way in selling of mushrooms. According to the farmers their neighbours buy little volumes of mushrooms and pay low price. The farmers do not have a bargaining power to negotiate the price with these customers.

Farmers have poor hygiene practices; it was found that the quality of mushroom they supplied was not in line with the hotel quality demand.

The study found that the extension services were insufficient to support the farmers to practices hygiene practices. By observing the ways the farmers used to keep unsold mushrooms were not suitable. Farmers are not able to added value to the mushrooms because they do not have postharvest skill. There were also poor coordination in the chain.

#### 4.2.1 Current Marketing Channels being used by Duhuze Cooperative Farmers

From the farmers, there are different channels that were used to deliver the product to the end user. The three channels identified in this study were hotel, open markets and neighbours. The results showed that most of the farmers (90%) sell their mushrooms to their neighbours whereas 5% sell their mushrooms to hotels and 5% sell to open market. All the respondents indicated that they take the mushrooms to their customers. There is no customer comes to the farmers to buy the mushrooms. By observing and interviewing the respondents, transparent buckets is their means used to carry the mushroom to the customers except one who uses paper bags.

**Table 7: Number of channels used by the farmers to sell the mushrooms**

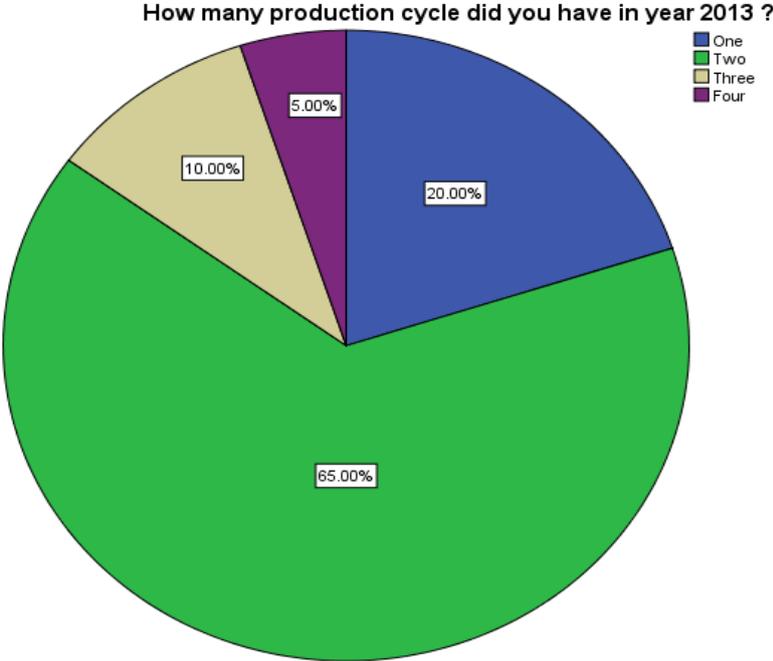
<b>Channels</b>	<b>Number</b>	<b>Percentage</b>
Hotel	1	5.0
Open market	1	5.0
Neighbours	18	90.0
<b>Total</b>	<b>20</b>	<b>100.0</b>

Source: Own compilation

**Number of Production Cycles those Farmers had in Year 2013**

The study wanted to find out the number of production cycles that farmers had in year 2013. Figure8 shows that the majority of the farmers (65%) have two production cycles, four farmers (20%) have one, two farmers have two (10%) and one farmer (5%) have four production cycles. This can be seen in the figure8. Considering that mushroom is grown four times in a year and the greater number of the farmers grow only two times in year. However, it is crucial to know why the farmers are not growing throughout the year. It is concluded that the farmers need to be thought about the production systems. Another reason is that the farmers are not growing throughout the year because they do not have the markets. Fresh mushrooms are fast yielding and they cannot stored for long time and therefore, farmers need to look for the markets before planting.

**Figure 8: Number of production cycle in year 2013**

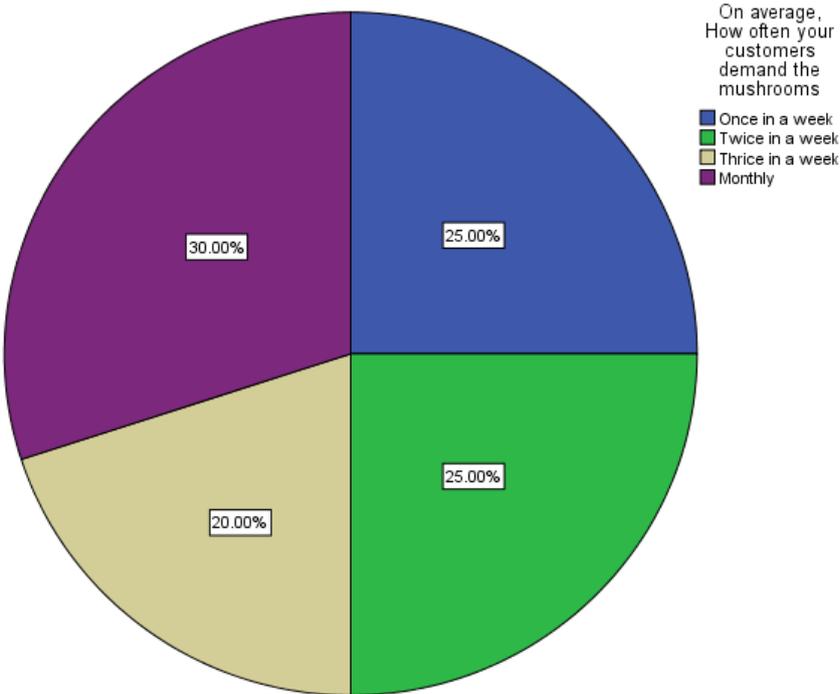


Source: Own compilation

Based on the results which presented on the figure 8 and also each farmer stated her/his output from each production cycle; the total annual production is 3884 kg of mushrooms (Appendix 13)

Figure9 shows the frequency of demand for the mushrooms. The majority of the farmers (30%) indicated that their customers need the mushrooms every month. Five farmers (25%) demand of supply is once in a week; five farmers (25%) the demand of supply is twice in a week and four farmers the demand is thrice in a week. These findings show that there is a demand of mushrooms. But comparing these findings with those of figure 8, it can be concluded that there is high demand but the supply is low. The reasons behind is the customers who pay low price and the farmers are not motivated to continue to supply.

Figure 9: Frequency of demand of the mushrooms by the customers



**4.2.2 Competitors**

According to the farmers of Duhuze cooperative, they are only farmers growing mushrooms and sell to the customers in Bugesera region. All the farmers indicated that they do not have any competitor in this district, but they compete amongst themselves. But this study focus on the competitor of Duhuze cooperative. However, from the interview with the manager of Lapalast hotel in Nyamata, I found also that there are two types of processed mushrooms sold to the hotel which is from China and South Africa. But the farmers are not aware of it.

### 4.2.3 Quality Requirements of the Markets

All the farmers (100%) said that they are aware of the quality required by the market. They said that their customers are more concerned with the quality because before buying, they look at the hygiene, freshness, and if mushroom are not spoiled. The farmers know that, they have to wash their hands before harvesting and to use cleaned equipment. Although the farmers know that to follow hygiene practices is important, but they do not know to practice.

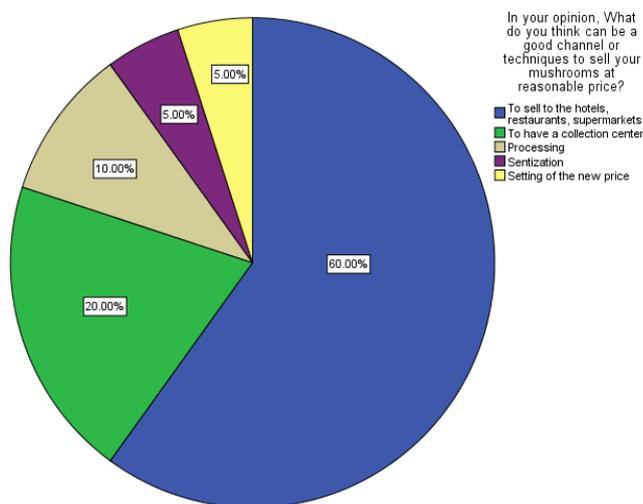
In addition to the quality requirements by the markets; hotels, restaurants, supermarkets and open market were interviewed. According to them, mushrooms should be fresh in appearance, cleaned, trimmed, free of insects, not refrigerated and not spoiled. Mushroom should be uncut (cup and its stem)

### 4.2.4 Alternative Channels

The farmers highlighted the channels that can be used to sell their mushrooms at reasonable price. The majority of the farmers (60%) believe that to sell the mushrooms to the hotel, restaurants or supermarkets is a good way to earn income from their mushrooms. The reasons mentioned by the farmers for preferring is, these channel pay a better price, they can take many kilograms and can be regular markets. Another group of farmers (20%) said to have a collection center either in Nyamata city or in Kigali can help them to sell their mushrooms at better prices. They consider that once there is a collection center in place, all farmers can bring their harvest to the collection center so that they can organize marketing themselves. 10% of the farmers mentioned processing of mushrooms before selling is a good way to generate high income from the mushrooms (Figure 10).

The above findings shows that a greater number of farmers want to sell their mushrooms to the hotels, restaurants and supermarkets.

Figure 10: Choice of alternative channels by the farmers



Source: Own compilation

Although the farmers have the choice to sell the mushrooms to Kigali, it is important to be aware of the competitors on this markets. There are other growers from different part of the country who supplied fresh and processed mushrooms. In addition, there are processed mushrooms from china.

### **First alternative: Hotels**

Based on the results from hotels that were interviewed and my personal observation, hotels sell fresh locally grown oyster mushrooms and imported processed button mushrooms mostly from China. Powder mushroom were only found in the Lapalast rock hotel. The quality requirements of the mushrooms for these hotels; mushroom should be fresh in appearance (colour), cleaned, free of insect, not refrigerated, not spoiled and the hygiene of packaging/containers for the mushrooms. On other hand, for the processed mushroom the most important consideration is expiration date. The buying price for the cultivated mushrooms is 1500 rwf/kg of fresh mushrooms for all the hotels interviewed. These hotels have different selling price such as Lapalast Rock (6000/kg), Classic hotel (20000 rwf/kg) and Umubano (22000 rwf) per one kilo of mushrooms. There is also a difference in demand of mushrooms between these three hotels. For instance, demand of Umubano hotel is 30kg per week, Lapalast hotel needs 5 kilograms of fresh mushrooms per week and Classic hotel needs 28 kilos of fresh mushrooms per week but the demand of the mushrooms to these markets is low compared to the Umubano hotel. A researcher observed that these markets have a contract with their suppliers. Hotels faced with constraints in marketing of mushrooms specifically on the quality. For instance, Lapalast Rock hotel faced the problem of poor hygiene of mushrooms from the farmers. These hotels are new compared to the Umubano. The requirements to be a supplier of these hotels are good quality. In addition, the farmers should be in cooperative or a company. The hotels require that the farmers have to come to them to negotiate before delivering of the mushrooms (more details can be found on Appendix 15)

### **Second alternative: open market**

This market sells only fresh mushrooms and the buying price is 1000 rwf whereas selling price is 2000 rwf/kg. The quality requirements demand by this markets, is freshness, hygiene of mushrooms and free of insects. The frequency of demand is 3 kg per week because he has only one customer who takes all these 3kg at once. The requirements in order to supply to the open market are good quality. Also farmer has to bring the mushrooms to this market. Based on this results, mushrooms are consumed only by one consumers in the whole market. This means that final consumers in this markets are very few even though the seller mentioned he did not faced any challenges in the marketing of mushrooms. (Appendix16)

### **Third alternative: Supermarkets**

The interview was conducted on two supermarkets; Simba and KIME LTD supermarkets in Kigali city.

**Simba supermarket** sells unprocessed (Fresh mushrooms) and processed mushrooms. (dried and powder mushrooms) produced in Rwanda but there is also canned mushrooms from China. KIME LTD sells fresh mushrooms and canned mushrooms from china.

They have different suppliers of mushrooms and buying price of fresh mushrooms. Simba buy the mushrooms at 1300 rwf and sells at 2000/kg. KIME buys the mushrooms at 1500/kg and sells at 2000 rwf/kg. The demand of mushrooms by these supermarkets is different Simba requires 49kg of fresh mushrooms per week whereas KIME requires 5kg of fresh mushrooms per week. For the processed mushrooms, is not known. KIME supermarket has to go another open market (retailer) to buy the mushrooms compared to Simba who has a regular supplier. That is why it said that if it got another supplier it will be good. Quality requirements of mushroom is the freshness, hygiene of mushrooms and their packaging, colour, size, no shrinkage and if mushrooms are not spoiled, whole mushroom with the cup and its stem. For processed mushrooms, expiration date is the most consideration. To be a supplier of these supermarkets, the requirements are to have good quality of mushrooms. A supplier has to bring the mushrooms to the supermarkets. In the KIME LTD supermarket the end user are few. Supermarket added that mushrooms are expensive. From my observation, the reasons behind this is because the supermarket has to go to buy the mushrooms from another retailer so operational cost is higher due to added transport cost. These

supermarkets said that fresh mushrooms are more preferred than imported mushrooms because they are fresh and locally produced (Appendix17)

#### **Fourth alternative: Restaurants**

These four restaurants are Corner view general trade ltd, Karibu restaurant, Rosty and Camellia Restaurant sell two types of mushrooms:

- Fresh mushrooms grown in Rwanda and the suppliers are the farmers
- Processed mushroom canned imported from China.

The buying price of fresh mushrooms is 1500 rwf/kg and is the same except Corner view general trade ltd who buys on kilo of mushrooms at 1700 rwf. But they differ in selling price; Corner view general trade ltd (18,000rwf), Karibu restaurant (17000 rwf) per kg of prepared mushrooms; other remaining restaurants' Managers do not know the selling price.

The demand for fresh mushrooms of these restaurants is 5kg every week (corner trade), 10 kg of mushrooms per month (Karibu), 4 kg every day (Rosty), 3kg everyday (camellia) respectively. These restaurants indicated that fresh mushrooms are the most preferred by the customers compared to the imported mushrooms.

Quality requirements are the freshness, hygiene of mushrooms and their packaging, colour, big or small size are preferred, not shrinkage and if mushrooms are not spoiled. For the processed mushrooms expiration date is the most important consideration.

The good quality and regular supply are the requirements. In addition to these, a farmer has to bring the mushrooms to the restaurants (Appendix 18).

#### **Fifth alternative: Processors**

Interview was conducted on BN producers and PPC Rengerabuzima processors. They perform the functions of seed multiplication, production, buying of fresh mushrooms and processing. They sell fresh or processed mushrooms either to the hotel or to the restaurants. After drying and grinding, they pack dried mushrooms into boxes or plastic bag whereas mushroom powder are packed into the plastic bottles. They process mushrooms from their farms or mushrooms from other farmers as agreed in the contract. Based on the selling price of dried and mushroom powder, the price of processed mushrooms is higher than fresh. For instance one kilo of dried mushrooms is 15,000 rwf and 20, 0000 rwf/kg of mushroom powder. Processors are linked to the market by the PSF and RBS. MINICOM also support BN producer by linking him to markets. In order to be a supplier for these processors, a farmer must buy the mushroom seeds from them under contract agreement (Appendix19).

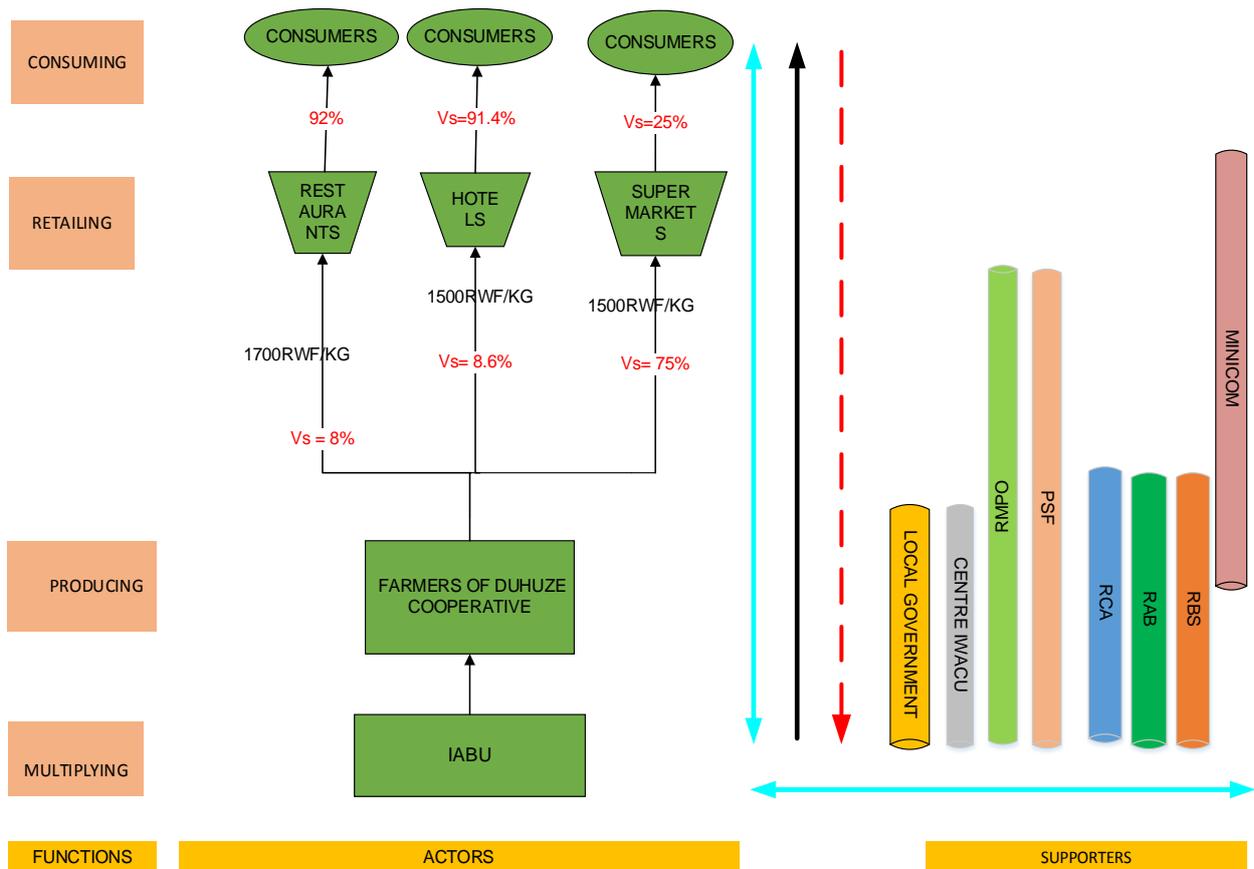
### 4.3. Data Analysis

#### 4.3.1. Chain Map of the alternative channels and Stakeholder Matrix for Analysis

##### 4.3.1.1. Chain map of the alternative channels

From the data from survey, interviews with the key informants and the buyers of mushrooms in Kigali city and Bugesera, preferred alternative channels were identified. A chain map alternative channels and stakeholders who can be involved in the mushroom value chain in Bugesera district.

Figure 11: Chain map of the alternative channels



Source: Own compilation



Vs= Value share

#### 4.3.1.2. Stakeholder Matrix Analysis

Table 8: Stakeholder matrix of the alternative channels

Stakeholder	Roles
<b>Chain supporters</b>	
RMPO (Rwanda Mushroom Producers)	Provides training on mushroom cultivation, seed multiplication to the cooperative and companies who are its members
PSF (Private Sector Federation)	Provides capacity building to the companies and cooperatives who are its members, links its members to the markets (regional and international)
RCA(Rwanda Cooperative Agency)	Provides legal personality to the cooperatives, training on cooperative management and law.
RBS(Rwanda Bureau of Standards)	Provides license to the processors, set the quality standards regarding to the mushrooms
RAB (Rwanda Agriculture Board)	Provides technical assistance to the seed multipliers and growers
MINICOM	Promote trade linkages and linking growers/processors to markets
Local government	Provides capacity building of the cooperative and to sensitize the farmers on cooperative policy and law
Centre Iwacu	Provides capacity building to the cooperatives. This includes providing to the farmers entrepreneurial skills, record keeping, looking for market and how to seek the financial support from the financial institutions
<b>Chain actors</b>	
Seed multipliers	Multiplier mushroom seed and sell to the producers
Producers	Grow the mushrooms and sell either to the hotels, supermarket, restaurants or open market
Supermarkets	Sell the mushrooms to the final consumers
Hotels	Sell the mushrooms after preparation into different food dishes to the final end user
Restaurants	Sell the mushrooms to the final consumer
Consumer (end user)	Consuming

### 4.3.2. SWOT Analysis

A SWOT analysis is a tool that was used to analyse the data from farmers' survey and interviews with the Key informants. This tool facilitated to see the strengths, opportunities, weaknesses and threats that farmers faced in the marketing of mushrooms. Therefore, it helped me to see the internal and external factors in order to know the impact of the weaknesses and threats that affect in the marketing of mushrooms. By identifying the weaknesses, you can know the precautions to take to minimize them.

**Table 9: SWOT Analysis of Farmers**

<b>INTERNAL</b>	
<b>STRENGTHS</b>	<b>WEAKNESSES</b>
<ul style="list-style-type: none"> <li>• Fresh mushroom are preferred than processed (imported processed mushrooms)</li> <li>• Availability of mushroom seed in Bugesera district</li> <li>• Have been trained in mushroom cultivation</li> <li>• Being in the legalized cooperative</li> <li>• Availability of infrastructure (road, water, electricity)</li> <li>• Living nearby the Nyamata city which is biggest trading center in Bugesera district and close to Kigali city</li> <li>• No competitor in mushroom cultivation in this district</li> <li>• The price of imported mushrooms is higher than locally produced</li> <li>• People in this district are aware of the mushrooms</li> <li>• Lapalast hotel wants to support farmers from in Bugesera District</li> <li>• The growers who supplied the mushrooms on the markets in Kigali are from outside of Kigali</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate knowledge on the markets search</li> <li>• No access on the information related to the markets.</li> <li>• No linkage with the potential buyers (restaurants, hotels and supermarkets)</li> <li>• Quality of the mushrooms is not in line with the market demand/poor hygiene practices</li> <li>• Lack of skills in postharvest technology</li> <li>• The clients (neighbours) pay low price</li> <li>• No relationship with other mushroom growers</li> <li>• Lack of confidence to approach the buyers</li> <li>• Insufficiency entrepreneurial skills</li> <li>• Lack of market organization, they operate individual</li> </ul>
<b>EXTERNAL</b>	
<b>OPPORTUNITIES</b>	<b>THREATS</b>
<ul style="list-style-type: none"> <li>• Government is favouring to work under the under group by organizing the mushroom producers into one organization</li> <li>• Having Centre Iwacu as a supporter</li> <li>• Having RMPO (Rwanda Mushroom Producers Organization)</li> <li>• Government is supporting mushroom by providing training</li> </ul>	<ul style="list-style-type: none"> <li>• No government body that is involved in the marketing of mushrooms</li> <li>• Competition with the mushroom from China and South Africa in Bugesera</li> <li>• Customers (neighbours) are more concerned about the low price and good quality.</li> </ul>

From above table, strengths and weaknesses are internal factors whereas opportunities and threats are external that affecting Duhuze muhroom cooperative farmers. The farmers should conctrated on the strenghts and opportunities and develop the strategies to minimize or eliminate weaknesses and threats.

## **CHAPTER 5. DISCUSSION**

This chapter discusses the results from the interviews, survey and observation that are presented in the chapter four. It describes two areas of study which are the composition of mushroom value chain in Bugesera district and the available market options for the Duhuze mushroom cooperative farmers.

### **5.1. The composition of mushroom value chain in Bugesera district**

#### **5.1.1 Stakeholders involved in the Mushroom Value Chain**

The study found that the stakeholders in the mushroom value chain are IABU, Duhuze mushroom cooperative farmers, Lapalast rock hotel, Nyamata open market, consumers, RAB and Centre Iwacu. Duhuze cooperative farmers play three roles in the mushroom value chain. The farmers act as the consumers because they consume unsold mushrooms. This is due to the fact that retailers in the chain are not able to take all mushrooms produced by the farmers. In addition, the farmers act as a retailer where they take larger volume of mushrooms and sell to their neighbours. Centre Iwacu is one of the supporters who plays a role on the market aspect where it provides trainings on market research. This information is new to the farmers and it is not yet well captured because Centre Iwacu is a new starter. However, the producers (farmers) are the actors who are affected in this chain due to the lack of linkages to the markets. This is in line with (Ferris et al., 2014) who said that when the chain is not well coordinated, some actors may be affected and the product cannot be delivered efficiently. In addition, the performance of the chain depends very much on the supporters who can coordinates the chain and provides support to the actors so that the product or service can be delivered at right time and place (Benito and Benito, 2006). The hotel and open market are the actors who added value to the mushrooms. But the hotel is the one who adds more value than open market. The performance of the chain also rely on how the actors are coordinated. An effective chain has to have a coordinator who can coordinate the actors so that they fulfil their functions efficiently as literature says (KIT and IIR, 2008).

#### **5.1.2. Information Flow**

The results show that market information was not accessed by the farmers. The majority of the farmers are not accessing information on the market except only one who got information from her relative. Information sharing is important as it helps to create strong relations amongst the actors. It also helps to reduce information asymmetry and opportunistic behaviour amongst actors. KIT and IIRR, 2008 indicated that marketing chain is well functioning when the relationship between the actors is based on the mutual understanding. It means that all actors respect the roles and needs of other chain actor in the chain. The relationships amongst the actors was based on the trust except Lapalast hotel who has a contract with the farmers. While a relationship based on trust portrays good relations between the actors involved, a contract between buyer and seller means a more permanent relationship (Anning et al., 2013).

Access to market information means information related to check the prices that are offered by the markets, where the buyers are and how to reach to them. In this case, the farmers can choose to sell to the buyer who pay a reasonable price. Therefore, market information is important to farmers because it helps them to make decisions and take advantage of market opportunities. This is in line with SNV (2013) who indicated that farmers benefit by accessing market information on price in the markets through radio or another media.

The results shows that the Local government where the farmers are located offers services to the farmers such as training on cooperative management, to search on market information, to advertise their produce and to link them to the buyers. But these services are

not realised by the farmers due to the poor coordination between stakeholders in the chain as it mentioned by Rashed et al. (2010).

### **5.1.3. The value Shares of the Actors in the Chain**

Information gathered from farmers indicated that their selling prices were the same except a farmer who sells the mushrooms to hotel. In the relation to the value share, the farmers has an equal value share with open market. It does not mean that farmer has the same profit as open market. It is because farmers are the ones whose cost of production is the highest whereas open market costs is in packaging. This is not in line with KIT and IIRR, (2008) who indicated that when farmer sells the produce to the retailer who in turn sells to the final consumer without adding the value to the product like processing, a farmer should has a higher value share. According to KIT and IIRR (2008) the farmer has low value share in the chain; it means that this market pay a farmer low price to the farmer.

Hotel in the chain has higher value share (75%) compared to the farmers. This means that hotel is the one who adds more value to the product compared to the farmer. Because it sells mushrooms after cooking. This is in line with KIT and IIRR (2008) who indicated that the when a farmer sells the fresh product and then a consumer buys such product from the retailers but in the processed form, the farmer has to have less value share due to the fact that he/she is the one who adds less value to the mushrooms compared to the hotel. In this case, hotel adds the cost of processing the fresh mushrooms into food. The costs is involves the buying of spices, labour, energy, water and other expenses. In regarding to the gross margin, farmers has less percentage gross margin (40.7%) compared to hotel (50%). In the mushroom chain supply, the majority of the farmers are selling the mushrooms to their neighbours and the farmers get less income.

### **5.1.4. The constraints encountered in the mushroom value chain**

From the results, the major buyers of the mushrooms are the neighbours of the farmers. In this case, farmers have no bargaining power to negotiate with the customers. The farmers has no other choice to get other clients due to the lack of linkage with other buyers, inadequate market information and insufficiency entrepreneurial skills. Inadequate knowledge on how to search for market and advertise their mushrooms is constraining the farmers in the mushroom business. The farmers lack confidence in sourcing potential buyers of mushrooms. They are not able to grow the mushrooms throughout the year because they are not connected to the regular markets who can buy all product. The current customers are paying low price. The farmers want to promote the mushroom in order to gain more clients but they are not able to perform this activity themselves. These constraints faced by the Duhuze mushroom farmers are similar to those of the smallholder farmers in Kenya (Gateri, 2009). From the interview with the staff in charge of cooperative in Nyamata sector, training on market research by using e-soko system and linkage with the buyers are provided to the farmers. However, these services are not realised by the farmers because 95% of the farmers mentioned that there is no one who provide to them market information.

It was found that extension services from the supporters towards to the chain was not enough due to the fact that there are few staff in the mushroom sector. The quality of the mushrooms produced by the farmers was inferior compared to the quality required by the hotel. This is due to the fact that information about the quality demanded by the markets such as hotels, restaurants and supermarkets is lacking amongst the farmers. This is in line with KIT and GRA (2013) who said that supportive policies are required in order to help the producers to produce good quality for the markets. These findings are supported by KIT and IIRR (2008) who demonstrated how the famers were trained on the improvement of the quality and marketing of their produce in Western in Kenya after identification of the problem. Despite the poor quality of the mushrooms and inadequate information on markets demand, a researcher observed that farmers lack postharvest handling skills. This is in line with Gateri et al. (2009) who found that intervention from all stakeholders was essential in order to

facilitate the smallholder to get out from the constraints encountered in mushroom value chain in Kenya.

## **5.2. The available Market Options for the Duhuze Mushroom Cooperative Farmers**

### **5.2.1 The Current Marketing Channels Duhuze Mushroom Cooperative Farmers used to sell the mushrooms**

The results indicates that there are three channels Duhuze farmers used to sell the mushrooms. All these channels are located in Bugesera district specifically in Nyamata city where the farmers are located. However, the biggest volume of the total production were sold to the neighbours of the farmers. The farmers of the Duhuze mushroom cooperative do not sell the mushrooms outside of Nyamata Sector. It was also found that these farmers do not sell the mushrooms at the farm gate instead after harvesting they walk in street looking for the customers. Only two of the farmers are selling the mushrooms to the intermediary channels. This is not in line with Mabuza et al. (2013) who have identified six channels which are used to sell mushroom by the growers in Bangladesh. The literature indicated that the highest percentage of the mushrooms were sold to supermarkets followed by farm gate, food processing (hotel and restaurants) and middlemen respectively but this is not the case with Duhuze cooperative farmers.

### **5.2.2 The Competitors of the Duhuze Mushroom Cooperative Farmers**

The farmers have no competitor of fresh mushrooms producing in Bugesera district. But there are competitors who supply imported mushrooms in this district specifically for Lapalast hotel. From observation of the researcher, there are two types of processed mushrooms that are sold in this hotel. These are canned mushroom imported from China and powder mushroom from South Africa. The variety of canned mushroom is white button whereas for the mushroom powder the variety is not indicated. The competitors have ability over mushroom farmers in Bugesera because they are able to produce good quality, consistent in delivery and flexibility. These competitors have some characteristics which allow them to differentiate themselves from the mushroom growers in Bugesera District. They add value to the mushrooms which allow these products to be kept for long time compared to the fresh mushrooms. These findings are supported by Suhong et al (2006) who showed that for an organization be competitive on the market has to deliver superior quality than its competitors.

### **5.2.3. Quality Requirements with Regard to the Marketing of Mushroom**

From the survey, 100% of the farmers showed that they are aware of the mushroom quality demanded by the markets. Most characteristics related to the quality that customers consider, this include freshness, hygiene of mushroom and the containers, not spoiled, size and color. From the interviews with the Manager of hotels, open market and restaurants, the quality of mushrooms is the most important consideration in buying. They look at the freshness, hygiene of mushrooms and their packaging, colour, insect free and if mushrooms are not spoiled. But supermarkets added that mushrooms should be uncut means mushroom has to have all its part. This is in line with Narendra.G and Hareesh.S (2010) who said that intermediaries markets such as supermarkets require mushrooms that has a cap, stem because he need also to sell to the end user. In addition Fardah and Cadilhon (2009) suggested that in order for farmers to be linked to the markets they must be able to meet the market quality requirements. They added that providing training to farmers on quality specifically on the hygiene issues help them to satisfy their customers. Value addition of the mushrooms also were found to provide high income to the farmers. Quality is the most important consideration in the marketing of the mushrooms. Mushrooms are perishable product, they can be easily damaged when they are not handled carefully. The results showed that transparent buckets and the paper bags were used to carry the mushrooms to the customers by the farmers. But the customer especially hotel indicated that bags used to carry the mushrooms affect the quality of the mushrooms. This was also stated by Gateri et

al. (2009) lacking of postharvest skills by the farmers and perishability are enable to sell the mushrooms.

#### **5.2.4. The Alternative Channels to Improve Farmers' Income**

The farmers highlighted different channels that they can use to sell the mushrooms. The most important channels were the supermarkets, food industries such as hotel or restaurants. The reasons mentioned by the farmers is that, these channels can pay a better price, they can take many kilos and can continue to buy the mushrooms from them. This implication was identified by Fardah and Cadilhon (2009) who found that farmers benefit more when they are linked to intermediaries markets. He found that relationship based on trust is important in the marketing linkages. Another technique that was found to be used to help the farmers to sell their mushrooms is having selling point in Nyamata where all farmers will bring their mushrooms so that they can organize marketing themselves. This suggestion is in line with SNV (2010) who found that when the farmers are able to sell their produce as a group helps them to gain more profit and bargain power.

From interview with the restaurants, open market, supermarkets and hotels, two restaurants and one supermarket in Kigali city the requirements demanded in order to supply the mushrooms to these markets were identified by the researcher. The most important points that researcher got from these buyers, they are concerned about the quality of the mushrooms. They want to buy mushrooms from the farmers who are in cooperative or a company. These channels want to negotiate with the farmers for price and time of delivery before supply of the mushrooms. That is why they need intervention so that they can be able to expand their markets. They need to have a committee who will be in charge of market research (KIT and IIRR, 2008). Unfortunately, they are not able to do this themselves.

From interviews and observation there is high demand of the mushrooms in Kigali city where demand of the fresh mushroom is 629 kg per month. Supermarkets require 231kg, hotels need 212 kg and 186kg for the restaurants. This in line with Tribichu and Buykusenge (2009) who indicated that there is a high demand of mushrooms in Kigali city especially in the intermediary markets.

From the interviews with the processors, farmers can sell the mushrooms through the processors where they can get contracts. This idea was indicated by Fardah and Cadilhon (2009) to help the farmers to sustain the mushroom production as well as increase income for the farmers in Bangladesh. Duhuze cooperative farmers cannot be linked to the processors because the processors require the farmers to buy the mushroom seed from them. In addition the farmers live very far from the processors.

Different institutions and RMPO which have been expected to be the supporters of the mushroom chain, were interviewed in order to see the services that they provide for the farmers who work under the cooperative. It is in this regard MINICOM, RCA, NAEB, RAB and RMPO. From interview with these institutions, apart from RAB and RMPO the rest are dealing with the processors. But there is an opportunity for the farmers because these institutions are willing to intervene in case there is a surplus of mushrooms. However, mushrooms have a short production cycle therefore looking for the markets before planting can be good.

## **CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS**

### **6.1. Conclusions**

The study found that the mushroom value chain in Bugesera District is made of different stakeholders who make up the actors and supporters of the chain. Actors are IABU as input supplier, farmers of Duhuze cooperative, hotels, open market, and consumers. Three types of consumers were identified; the consumers who bought the mushrooms from the open market, those who bought from the hotel and the consumers who bought from the farmers. The chain also has supporters such as RAB and Centre Iwacu who are in charge of providing training to the farmers. The supporters are the government body as well as non-governmental institution. It was found that there is no one who is in charge of supporting the farmers to reach to the potential buyers of mushrooms. In addition to these, ministry and institutions expected to support the chain such as MINICOM, MINAGRI, NAEB, Local government, RMPO and RCA do not provide any services to the mushroom chain where the Duhuze mushroom cooperative farmers is acting.

There is information flow amongst the actors and the same time, there is information flow between actors and supporters. It was found that that market information was not accessed by the farmers where the greater number of the farmers indicated that no one provides them market information. This is due to the fact that there is inadequate coordination in the chain.

Farmers who sell mushrooms at 1000 rwf/kg has a less value share compared to the other actors. This case was observed for the farmer who sells the mushrooms in the open market and neighbours. The value share of the farmers who sell to the hotel was also calculated and it was found that hotel has higher value share than farmer. It pays 1500 rwf/kg to the farmers. The study found that hotel is offering a better price than others. And it was concluded that the farmers can be linked to the hotels so that they can generate income from growing of the mushrooms.

The farmers sold the mushrooms to the three channels which are open market, hotel and their neighbours. The remaining volume is used by the farmers themselves for their own home consumption. The biggest volume of the total production of mushrooms is sold to their neighbours. It was found that only hotel is paying a better price compared to other channels. On the production level, a greater number of the farmers do not grow the mushroom throughout the year. Farmers are not motivated to continue to supply to the neighbours as well as the open market. This is due to the fact that the customers are buying few kilos of mushrooms and they are paying low price to the farmers.

The farmers encountered various constraints. The most important were the lack of the markets for the mushrooms. They do not have linkages with the potential buyers such as restaurants, hotels and hotels. This is because farmers do not have access to market information as well as entrepreneurial skills.

The farmers do not have bargaining power, they are not able to negotiate for better prices with their customers. It was found that farmers know about the quality of mushrooms required by the markets but they have poor hygiene practices. Therefore, the study conclude that producing good quality is the most important consideration for the farmers to be able to enter and to be competitive on the markets.

The study found that the buyers of the mushroom such as hotels, supermarkets and restaurants want to buy a healthy mushroom which are fresh and not refrigerated. The hygiene of the mushrooms is also part of the requirement by the markets. However, it was analysed that the farmer do not follow hygiene practices during mushroom growing. Their mushrooms are not meeting the quality demanded by the hotel. Poor coordination was also observed amongst the players of the chain.

The alternative marketing channels are available for Duhuze cooperative farmers to sell their mushrooms. The farmers can sell the mushroom to the restaurants, hotels and supermarkets. These channels they can pay better price and they are regular markets. Furthermore, they buy larger quantity compared to the neighbours. The standard requirements for the farmers be able to supply the mushrooms to these channels is good quality.

The study found that there are processed mushrooms mostly from China which are sold in Rwanda. The price of these mushrooms is high compared to the price of fresh mushrooms.

The study found that in order for the farmers to generate income through growing of the mushrooms they need to be linked to the intermediary markets such as hotels, supermarkets and restaurants. Therefore, the following strategies were identified in order to link the farmers to these markets: first strategy is focused on the marketing part to concentrate on market research in order to find information on markets demand such as prices, quality, quantity and time of delivery. Second strategy is focused on the organization of the supply (production) to meet market requirements and to avoid the surplus or shortage of the mushrooms on the markets. Value addition of the mushrooms was found that to help the farmers to increase income.

The study found that there are other cooperatives and companies from different part of the country who are in the mushroom business. And these cooperatives and companies made of Rwanda Mushroom Producers Organisation (RMPO).

## **6.2. Recommendations**

For the Bugesera Mushroom Cooperative Union (IABU) in order to enhance the wellbeing of the Duhuze mushroom cooperative farmers, the following recommendations can be used to link them to high value markets:

Farmers are organised in the cooperative but do not have a marketing organization. The first step is to identify the potential buyers of mushrooms such as hotels, restaurants and supermarkets in Bugesera district and Kigali city.

The second step is to establish relationship with the potential buyers (identified buyers). This will be achieved by creating a marketing committee who will conduct market research on the identified buyers. This will include to talk to the buyers to negotiate with them about the quantity, quality, price and time of delivery. This will help the farmers to be connected with the potential buyers of mushrooms.

It is necessary to be aware of the competitors in the target markets before to enter especially in Kigali city.

Third step is to empower the farmers to improve on the quality of the mushrooms including trimming and sorting. This will be achieved by providing training on hygienic practices in whole process. Hygiene practices should be followed up from planting up to delivery of mushrooms to the markets. This will help the farmers to produce a good quality of the mushrooms as required by the markets

Fourth steps is the organization of the supply (production) to avoid the surplus or shortage of the mushrooms on the markets. The strategy is to put the farmers into sub groups according to their site and then to facilitate alternative cultivation according to the demand of the markets. This will help to avoid over production or shortage of mushrooms on the markets. There is a need to establish a production process and time delivery schedule. This will include logistic arrangement, such as crates used to harvest, crates used to carry

mushrooms to the market and transportation. Direct sales to the supermarkets/ restaurants, hotels have to be carried out to maintain the quality of mushrooms such as freshness.

Public transportation will be used to reach to the markets because the farmers do not have their own truck.

Fresh mushrooms are perishable products and they cannot be stored for a long periods. Also the farmers do not have skills in the processing of the mushrooms. There is a need to provide training to the farmers on postharvest technology to avoid losses after harvesting.

The farmers are not operating as a group, each farmer operate individually without combining the power. There is a need to facilitate a group/cooperative marketing where the farmers after harvesting bring the harvest to together and sell as a group. The strategy is to encourage the farmers to collect their harvest and bring them to the cooperative equipped with the refrigerator. The farmers will be able to have the bargaining power for their produce. In this case, customers (neighbors, office workers and tourists) will come to buy the mushrooms from the farmers.

There is a need Duhuze cooperative to make a partnership with RMPO (Rwanda Mushroom Producer Organization). This is an opportunity for all members of IABU where they will be able to communicate with other growers. The requirements are not too high, being in cooperative which is legalized is enough. This will help the farmers to get information on the market demand and sharing of knowledge and experience with other growers and to be able to expand the markets. The strategy is to make a request to the representative of RMPO.

There is a need to link the Duhuze cooperative to financial institutions because farmers do not have the capital. This will help the farmers to be able to buy driers and grinding machines for mushroom processing. It will also help them to perform all necessary activities required to meet the markets demand.

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**APPENDICES**

**Appendix 1: Survey questionnaire for Duhuze mushroom cooperative farmers**

Dear respondent,

My name is Angeliqe Mukandekazi, a master student in Horticulture chains in Van Hall Larenstein University of Applied Sciences. I am conducting a research on which marketing strategies that can lead to a higher value share in mushroom value chain specifically in Bugesera District. I would like to request you to answer the below questions that will take only 15 to 20 minutes. Your answers will be used only for the purpose of this study and will be kept confidentially. Thank you for your cooperation.

**Identification of Respondents**

**Code Number of Respondent:** .....  
**Cell/Village:** .....  
**Date:** .....

**Questionnaire for the farmers**

1. Where do you sell your mushrooms?  
(i) Restaurants; (ii) hotels; (iii) open markets; (iv) Neighbors,  
(v) Others: specify:  
.....  
.....
2. State the location of your buyer/customer
3. Why do you choose to sell your mushrooms to this customer?  
(i) Nearest to you; (ii) difficulty to get another customer (explain) (iii) other reasons  
.....  
.....
4. How much money do you sell one Kg of mushroom?  
.....  
.....  
.....  
.....
5. How your product reach to your customers?

- .....
- .....
6. How do you communicate with your customers?  
 (i) Mouth to mouth; (ii) mobile phone; (iii) other (specify).....
7. What are you relationship with your customer?  
 (i) Informal (Trust); (ii) Formal (Contract)
- 8 .On average, how often customers demand to be supplied the mushrooms?  
 (i) Never; (ii) Everyday; (iii) once in a week; (iv) twice in a week; (v) thrice; (vi) four in week,  
 (vii)other
9. Are you aware of the quality of mushroom required by the markets?  
 (i) Yes  ; (ii) No
10. Who provides to you the market information?  
 (i) None; (ii) Duhuze cooperative management; (iii) others  
 Specify  
 .....
11. Before your customers buy the mushrooms, what they consider in buying mushrooms?  
 .....
12. Are your customers satisfied with the quality of your mushrooms?  
 (i) Yes  ; (ii) No
13. If No, why?  
 .....
14. What do you think about the price paid by your customers?  
 (i) low (ii) moderate; (iii) good;( iv) very good
15. What are the barriers that hinders you to expand the markets for the mushrooms?  
 .....
16. Who are your supporters and what services they provide to you?  
 .....
17. Did you get any training about mushrooms?  
 (i) Yes; (ii) No;
18. If yes, by who and which knowledge do you get?  
 .....
19. How many production cycle do you have in a year?  
 (i) one; (ii) two, (iii) three ;(iv) four
20. How much money do you get in each production cycle?
21. How much money do you invest in each production?

Fill the table below

Items	Quantity	Unit cost (rwf)	Total costs (rwf)
Mushroom seeds			
Transport of mushroom seed			
Plastic film			
Water			
Labour			

22. Do you have competitors in this District?

(i) Yes; (ii) No

23. If yes who are they?

24. Do you have any idea on how their business is doing?

(i) Yes; (ii) No

25. What are the challenges do you face in the marketing of mushrooms?

(i) Lack of market; (ii) low price given by the markets (iii) other (specify)

26. In your opinion, what do you think can be a good channel to market your mushrooms at reasonable price? And why?

.....  
 .....

## Appendix 2: Checklists of interview questions for the retailers

### Interview questions for the Retailers (supermarkets, open markets, hotels and restaurants)

1. What variety of mushroom do you sell?
2. What types of mushrooms do you sell and origin? At which price?  
Unprocessed (fresh)  
Processed (dried, powder, canned ...)
3. What categories of suppliers do you have? Why this supplier? What are the requirements in order to be your supplier?
4. How do you get the mushrooms?
5. How do your supplier satisfy you in consideration of quality and quantity of mushrooms? (freshness, hygiene, sufficient)
6. What are the requirements in order to be your supplier?
7. How much money do you purchase for one kilo of mushrooms? Unprocessed (fresh); processed (canned, powder)
8. How much money do you sell one kg of mushrooms? Unprocessed (fresh); processed (canned, powder)
9. Which type of mushrooms do your customers prefer most? And why?
10. How regularly do you need mushrooms and what quantity?
11. How do you communicate with your suppliers?
12. Which relationship do you establish with your suppliers?
13. What preferred quality are you looking before buying the mushrooms?
14. What are the challenges do you faced in the marketing of mushrooms?
15. How do you solve these challenges? And unsolved challenges, what strategies can be used?
16. What can be done to improve the farmers to market their mushrooms at reasonable price?

## Appendix 3: Checklist of interview questions for the supporters

### A. Interview questions for RAB

1. What services do you offer to the mushroom cooperative farmers precisely to the farmers?
2. How these services are delivered to the mushroom cooperative farmers?
3. What is your involvement in relation to link the mushroom farmers to the markets?
4. What are the constraints in relation to the marketing of mushrooms?
5. What can be done to improve the farmers to market their mushrooms at reasonable price?
6. What are your future plans in relation to targeting farmers to reach to high market of mushrooms?

### B. Interview questions for the MINAGRI/NAEB

1. What services do you offer to the mushroom cooperative farmers precisely to the farmers?
2. How these services are delivered to the mushroom cooperative farmers?
3. What is your involvement in relation to link the farmers to the markets?
4. What are the constraints in relation to marketing of mushrooms?
5. What can be done to improve the farmers to market their mushrooms at reasonable price?
6. What are your future plans in relation targeting farmers to reach to high market of mushrooms?

**C. Interview questions for the RCA**

1. What services do you offer to the mushroom cooperative farmers precisely to the farmers?
2. How these services are delivered to the mushroom cooperative farmers?
3. What is your involvement in relation to link the farmers to the markets?
4. What are the constraints in relation to marketing of mushrooms
5. What can be done to improve the farmers to market their mushrooms at reasonable price?
6. What are your future plans in relation to help the farmers to reach to high market of mushrooms?

**D. Interview questions for the Local government/person in charge of cooperative at the sector level**

1. What services do you offer to the mushroom cooperative farmers precisely to the farmers?
2. How these services are delivered to the mushroom cooperative farmers?
3. What is your involvement in relation to link the mushroom farmers to the markets?
4. What are the constraints in relation to the marketing of mushrooms?
5. What can be done to improve the farmers to market their mushrooms at reasonable price
6. What are your future plans in relation targeting farmers to reach to high market of mushrooms?

**E. Interview questions for the Ministry of Trade and Industry?**

1. What services do you offer to the mushroom cooperative farmers precisely to the farmers?
2. How these services are delivered to the mushroom cooperative farmers?
3. What is your involvement in relation to link the mushroom farmers to the markets?
4. What are the rules and regulations regarding to the marketing of mushrooms?
5. What are the constraints in relation to the marketing of mushrooms?
6. What can be done to improve the farmers to market their mushrooms at reasonable price?
7. What are your future plans in relation targeting farmers to reach to high market of mushrooms?

## **Appendix 4: Checklist of interview questions for the processors**

1. Where do you get the mushrooms?
2. What types of suppliers of fresh mushrooms do you have?
3. What are the requirements in order to be your supplier of fresh mushrooms? And quality requirements?
4. What type of customers do you have?
5. How do you communicate with your suppliers? And customers?
6. How regularly do you need mushrooms to process?
7. How much money do you purchase for one kilo of mushrooms?
8. How much money do you sell one kilo of processed mushroom?
9. Who are your supporters and what services they provide to you?
10. What the challenges do you face in the marketing of mushrooms?
11. How do you solve these challenges? And unsolved challenges, what strategies can be used?
12. What can be done to improve the farmers to market their mushrooms at reasonable price?

### **Interview questions with the RMPO (Rwanda Mushroom Producers Organisation)**

1. What is RMPO and what are the requirements to be a member of RMPO?
2. What services do you offer your members?
3. Who are your supporters and what services provide to you?
4. How do you communicate with your supporters? Members?
5. What can be done to improve the farmers to market their mushrooms at reasonable price?
6. What are the constraints do you face in relation to the mushroom business?
7. What are your future plans in relation to targeting farmers to reach to high market of mushrooms?

## Appendix 5: Calculation of the variable costs

Table of the variable costs, total yield, total sales, and total volume consumed per one production cycle of mushroom (rwf)

Code of the respondents	Variable cost (rwf)	Total yield (kg)	Total sales (kg)	Consumption (kg)
BATLILMAR1	66 000	70	50	20
BIGEMAMAR2	34 500	30	6	24
ABIVENMAR3	123 000	150	120	30
NIYJOSMAR4	66 000	68	45	23
NIYALPHKAY5	123 000	150	90	60
MWEEMENYV6	66 500	68	40	28
NYIBERNNYV7	66 000	62	50	12
MUKTASSNYV8	67 000	65	35	30
MUKESPNYV9	34 500	30	20	10
MUKJEANYV10	64 000	68	40	28
HABPASNYV11	66 000	54	45	9
UWAPRUNYV12	65 500	66	38	28
MUKMARKAN13	66 000	69	35	34
BATJULKAN14	117 000	160	150	10
MUKESPMUR15	66 000	70	30	40
MUKDONMUR16	66 000	68	20	48
PNYILAUMUR17	64 500	67	52.5	14.5
BAMHYAMUR18	66 500	72	40	32
NYAMESTMUR19	185 000	210	180	30
NYICECKAR20	114 000	165	130	35
<b>Total</b>	<b>1 587 000</b>	<b>1 762</b>	<b>1 216.5</b>	<b>545.5</b>

Average variable cost= Total variable costs for all 20 farmers/the total yield from all 20 farmers. Hence, **average of the variable costs per one kg =1587000/1762=900**

### Appendix 6: Variable cost of the hotel in Bugesera

Given that hotel sells mushroom after preparation into food

1 EUR= 920 rwf

Table of Variable costs of hotel to sell one kilo of mushrooms

Items	Unit price	Total price
1 kg of mushrooms	1500	1500
Spices+oil	750	750
water	50	50
energy	200	200
labour	500	500
<b>Total</b>		<b>3000</b>

### Appendix 7: Variable costs of the Nyamata open market

Table of variable cost of the open market to sell one kilo of the mushrooms

Items	Unit price	Total
1 kg of mushrooms	1000	1000
Packaging	50	50
tax	50	50
Fees for communication (phone)	100	100
<b>Total</b>		<b>1200</b>

### Appendix 8: Value share for the farmer who selling to the hotel in Kigali

Chain actors	Variable costs	Revenue Selling price	Gross income Revenue-Costs	Added value Revenue-Previous actor's revenue	Gross margin Gross incomex100/ Revenue	Value share Added value x100/Retailer price
<b>Farmer</b>	925	1500	575	1500	38%	<b>8.6%</b>
<b>Open market</b>	<b>5250</b>	17500	12250	16000	70%	<b>91.4%</b>

For the variable costs for the farmers, transport from Bugesera to Kigali should be added;

**Assumptions:** transport from Nyamata to Classic hotel in Kigali is 1600 rwf (two ways)  
 The average of the volume of the mushrooms required by the three hotels interviewed were calculated which is 63kg per week. Therefore, one kilo of mushrooms requires 25.4 rwf. Variable cost is  $900+25.4= 925$  rwf/kg

### Appendix 9: Variable costs for the hotel in Kigali

Table of Variable costs of hotel to sell one kilo of mushrooms

Items	Unit price	Total price
1 kg of mushrooms	1500	1500
Spices+oil	3500	3500
water	50	50
energy	200	200
labour	1000	1000
<b>Total</b>		<b>5250</b>

### Appendix 10: Selling to the restaurants in Kigali

Chain actors	Variable costs	Revenue Selling price	Gross income Revenue-Costs	Added value Revenue-Previous actor's revenue	Gross margin Gross incomex100/ Revenue	Value share Added value x100/Retailer price
<b>Farmer</b>	925	1700	775	1700	45%	<b>8%</b>
<b>Open market</b>	<b>5250</b>	21250	16000	19550	75%	<b>92%</b>

## Appendix 11: Selling to the supermarkets in Kigali

Chain actors	Variable costs	Revenue Selling price	Gross income Revenue-Costs	Added value Revenue-Previous actor's revenue	Gross margin Gross income×100/ Revenue	Value share Added value ×100/Retailer price
<b>Farmer</b>	925	1500	575	1500	38%	<b>75%</b>
<b>Supermarkets</b>	1600	2000	400	500	20%	<b>25%</b>

## Appendix 12: Variable costs for the supermarket

Items	Unit price	Total price
1 kg of mushrooms	1400	1400
Packaging	100	100
Miscellaneous	100	100
<b>Total</b>		<b>1600</b>

### Appendix 13: Calculation of total annual production of mushrooms

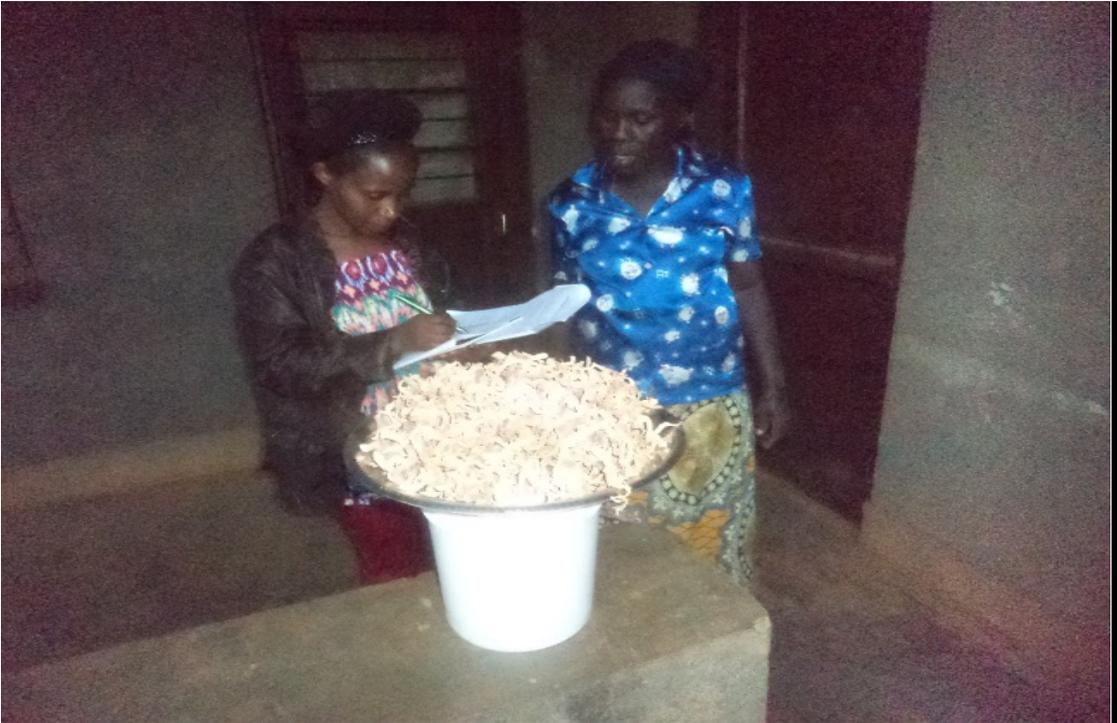
Code of the respondents	Number of production cycle	Total yield (kg)	Input (money)
BATLILMAR1	2	186	205000
BIGEMAMAR2	2	240	180000
ABIVENMAR3	1	150	180000
NIYJOSMAR4	2	303	200000
NIYALPHKAY5	1	150	120000
MWEEMENYV6	2	98	100000
NYIBERNNYV7	2	77	96000
MUKTASSNYV8	2	108	108000
MUKESPNYV9	3	150	175000
MUKJEANYV10	2	188	170000
HABPASNYV11	1	54	50000
UWAPRUNYV12	2	136	124000
MUKMARKAN13	4	367	322000
BATJULKAN14	1	160	180000
MUKESPMUR15	3	150	230000
MUKDONMUR16	2	358	250000
PNYILAUMUR17	2	277	270000
BAMHYAMUR18	2	132	144000
NYAMESTMUR19	2	390	370000
NYICECKAR20	2	210	205000
<b>Total</b>		<b>3884</b>	<b>3679000</b>

Picture 1: Survey with the farmers at their residence place



The farmers is explaining how she sells her mushrooms

A farmer harvest the mushroom and she lacks the customers, then she decided to dry them for consumption.



The farmer is providing the information about his sales and investment



Picture: Survey with the farmers in Nyamata

## **Appendix 14: Interviews with the institutions and Ministry**

### **(i) Interview with Rwanda Agriculture Board (RAB)**

RAB provides training on mushroom cultivation and supervision of the farmers. Mobile is the mean of communication but training is done face to face. It does not involve in linking the farmers to the market because there is no strategic plan in place. RAB in collaboration with MINAGRI, organizes (Agri-show) which is held at Mulindi each year to support the farmers who are working under the cooperative or individually to attend exhibition so that they can show their product and meet the buyers. RAB collaborates with the RBS in the setting of the laws and regulations as well as the quality standards regarding the mushroom tubes production.

There are few numbers of the staffs in the mushroom farms who can be able to supervise the farmers daily to daily.

### **(ii) Interview with NAEB**

During the field work, Researcher expected to interview Ministry of agriculture in order to see which services offers to the farmers, its involvement in the linking farmers to the markets, constraints in the marketing of mushroom and its future plans in targeting farmers to reach to the higher markets. However, when Researcher reached there, this ministry said that mushroom crop is in the NAEB's responsibility especially in the department of horticulture.

Therefore, Researcher found that NAEB do not work with smallholders farmers but with the mushroom processors who are considered as the large company play role in exportation.

### **(iii) Interview with the RCA**

RCA offers capacity building to the cooperative through the trainings on cooperative management, inspection and supervision, leadership, governance and laws. It offers a conflict resolution in case there are conflict in the cooperative. It offers the legal personality. These services are regarding all cooperatives in general.

#### **(iv) Interview with the Local government**

Picture 2: Interview with Local government

Services offered to the farmers: training on cooperative management, market search for their produce.

Their involvement in relation to link the farmers to the markets: it provides training to the farmers in searching market. It links the farmers with the buyers so that the farmers can know where to sell their produce. They show the farmers the ways on how to search the market by using e- soko system. This is the methods where the farmers can use their mobile phone in order to know information on the markets. These information is related to the prices of commodities or comparison of the prices at different places and the markets so that famers can know where to sell their products. Researcher found that a local government do not help the mushroom farmers.



#### **(v) Interview with the Ministry of Trade and Industry**

Head of the department in charge of small and large industry were interviewed. So far MINICOM doesn't offer any service to the mushroom smallholder farmers except to link the processors because they are able to obtain enough volume. MINICOM believes that the farmers are able to search the market themselves because the mushroom sector is still small and production is low. According to the internal and external trade in charge, of horticulture sector, they said that the ministry deals mostly with tomatoes, beans and fruits because the production of mushroom is still low.

As future plans of the MINICOM, in case there is surplus or any complaints from the farmer groups or companies about lack of market, MINICOM is ready to intervene by linking them to the processors or to other markets (external).

## **(vi) Interview with the Representative of RMPO**

RMPO is composed of registered 10 companies and 12 cooperatives that are in mushroom growing and seed multipliers and it is registered in PSF. The Representative of the RMPO were interviewed about the requirements in order to be a member of RMPO, services offers to the member, their supporters, mean of communication with the supporters and the members, what can be done to help the farmers to market their produce, constraints encountered and the future plans in relation to the mushroom business.

RMPO provides the training to the farmers who are their members about mushroom cultivation. RMPO also links the farmers who are their members to the markets by providing to them the market information regarding to where they can sell mushrooms, quantity, price and quality. RMPO is supported by RAB and PSF. The services offered by the RAB are trainings and other services such as providing offices. PSF also offers several services; it links to the markets, provides capacity building (provides trainings on the postharvest and entrepreneurship skills. Both mobile phone and email are the mean of communication with their members and supporters.

To be a member of RMPO, you must be in a *cooperative or individual company*. A *cooperative must has a legal personality provided by RCA whereas a company must be registered by RDB*. A cooperative or accompany has to provide a share in the RMPO. The main constraints RMPO encountered was the delays to get the legal personality.

RMPO has plans to establish the collection centers as well as the selling point/site in each District where their members are located.

## **Appendix 15: Interviews with Hotels**

### **(i) Interview with the Manager of PALAST ROCK HOTEL / NYAMATA-BUGESERA**

This hotel is located in Bugesera district precisely in Nyamata cell.

Types of mushrooms they sell and the origin: *cultivated mushrooms* which are fresh mushrooms produced locally, *processed mushroom (canned from china and powder from South Africa)*. Hotel has two categories of supplies such supermarkets and the local farmers who supplied the fresh mushrooms.

Hotel chooses to buy the fresh mushrooms from the farmers because hotel wants to support the local farmers especially farmers from Bugesera district. The mean of communication with their suppliers is *mobile phone while the relationship is formal*. Hotel agreed with the farmers to bring their mushrooms and paid immediately. There is no written contract. The fresh mushrooms, farmers must bring their mushrooms to the hotels.

Their suppliers satisfy the hotel in relation *to the quantities and freshness but not in relation to the hygiene*. The farmers do not respect hygienic conditions in supplying of their mushrooms. *Hotel purchases one kilo of cultivated mushroom at 1500 RWF which is in turn gives about 6000 rwf.*

*Hotel buys processed (canned) mushrooms at 1000 rwf for 400 grams which can give the same amount of money as the cultivated mushrooms.*

*Fresh mushrooms are preferred mostly by the customers than processed. They prefer these mushrooms due their taste and flavor/have good smell. Also customers think that they are fresh and locally produced. They believe that fresh mushrooms have more nutrients than processed.*

*They prefer these mushrooms due their taste and flavor/have good smell.*

*The hotel needs at least 5 kilos of fresh mushrooms per week and 3 kilos of processed.*

*Before buying unprocessed mushrooms, freshness, hygiene of mushrooms and their packaging, colour, shrinkage and if mushrooms are not deteriorated. For the processed mushrooms, he/she verifies mushrooms if are not expired.*

Picture 3: Interview with the Manager of Lapalast Rock hotel



Challenges faced in the marketing of mushrooms:

*Farmers bring their mushrooms without removing dirties. In addition, they carry the mushrooms in the bags most of the time these bags are not cleaned.*

*To sensitize and promote the mushrooms in order to be known by the many people. To organise the growers into the cooperatives or associations can help them*

### **Observation**

Picture 4: Observation of mushroom in the Palast rock hotel

Observation was method was used to see which *country imported mushrooms* are from, what the varieties of mushrooms sold on the markets in Rwanda, *selling and buying prices where it was possible*. From the results of interviews on the markets, some buyers said that they do not know varieties of the mushrooms they sell (Palast hotel, classic hotel, Corner view general trade restaurant, Karibu restaurant and Rosty restaurant) and others do not know which country canned mushrooms are from. Observation was used to see where the farmers grow the mushrooms.



## **(ii) Interview with UMUBANO Hotel / Gasabo District- Kigali City**

Oyster mushroom is the variety which Umubano hotel sells to the customers. Hotel sells two types of mushrooms which are fresh mushroom grown in Rwanda and processed (canned) mushroom from China. Hotel has two categories of the suppliers such as supermarkets which supplied canned mushroom and individual farmers for fresh mushrooms.

The buying price for the fresh mushrooms is 1500 rwf and 1000 rwf for 400 gram of canned mushrooms. Hotel can get 22,000 rwf per kg of mushrooms.

Fresh mushrooms are preferred mostly by the customers. On average, hotel need 30 kilos of fresh mushrooms per week and 30 kilos of canned per month because can be kept for long time. Mobile phone is the mean of communication with their suppliers. Hotel signed a contract with their suppliers.

In relation to the quality, the points considered are freshness, hygiene of mushrooms, colour, shrinkage and if mushrooms are not deteriorated or refrigerated.

For the processed mushrooms, he/she verifies mushrooms if are not expired. Hotel did not encountered with any challenge in the marketing of mushrooms.

In order to improve the farmers or growers to market the mushrooms at reasonable price, concerned institutions and Ministries have to provide the trainings to the farmers on postharvest technology.

## **(iii) Interview with the Manager of CLASSIC HOTEL / Kicukiro District-Kigali City**

Hotel sell cultivated mushrooms and the wild mushrooms. Cultivated mushrooms are supplied by individual company whereas wild mushrooms are from the farmers who got them from the wild. There is no reasons for choosing this supplier:

Both individual farmers and company must be to bring their mushrooms to the hotels.

Hotel purchase one kg of cultivated mushrooms at 1500 RWF and 2500 RWF the wild mushrooms. Hotel get 18,000rwf from one kg of mushrooms either wild or cultivated.

Wild mushrooms are preferred mostly by the customers than cultivated mushrooms. They prefer these mushrooms because these mushrooms are known since in the past. And also because of their taste and flavor. Hotel needs 4 kilogram of fresh mushrooms per day. Mobile phone is the mean of communication with their suppliers. There is written contract between hotel and their suppliers. And there is no challenges hotel encountered in the marketing of mushrooms.

Before buying unprocessed most important points considered are freshness, hygiene of mushrooms and their packaging, colour, shrinkage and if mushrooms are not deteriorated.

There is a need of sensitization and promotion of cultivated mushrooms so that many people can get more understanding about this crops.

## Appendix 16: Interview with Open market

### **(i). Interview with the Buyer of Mushrooms in the Open Market Nyamata-Bugesera**

Types of mushrooms he sells and the origin: fresh mushrooms which are grown in Bugesera region and their suppliers are the farmers from this District.

They choose the farmers to supply the mushrooms because are the only who grow fresh mushrooms.

He contacts the farmers by mobile phone and then they bring mushrooms to him. And he paid them immediately. Their suppliers satisfy him in relation both the quantities and quality. This market purchase one kilo at 1000 rwf and he sells at 2000 rwf per kg. *About the frequency he needs mushrooms, he needs 3 kg per week because he has only one customer who takes all these 3kg at once.*

Farmers bring their mushrooms and paid them immediately. There is no written contract between him and the farmers.

About the preferred quality before buying mushrooms, he looks at the freshness, hygiene of mushrooms and if they are not attacked by insects.

*There are no challenges faced in the marketing of mushrooms except the poor quality of the mushrooms from the farmers.*

## Appendix 17: Interviews with supermarkets

### (I) Interview with the Seller of Fruits and Vegetables at SIMBA SUPERMARKET. Nyarugenge District-Kigali City

The Variety he sells is the Oyster mushrooms

Simba sells two types of mushrooms:

- unprocessed (Fresh mushrooms) produced locally (Rwanda)
- processed mushroom (canned from china), dried and powder mushrooms from Rwanda)

Categories of suppliers are the larger companies who supplied canned mushrooms and

mushroom grower companies who supplied fresh, dried and powder mushrooms

Supermarket chooses this supplier because better price, regular supply, time delivery and always mushrooms are fresh. They use mobile phone to communicate with their suppliers and the relationship is based on trust.

For locally processed and unprocessed mushrooms, their suppliers have to bring the mushrooms to the supermarket any time are needed.

The buying price for fresh mushrooms is 1300 frw per kg, dried and powder processed in Rwanda is 16000 rwf per kg and 800 rwf for canned from china.

The selling price for fresh mushrooms is 2000 rwf per kg and 20000 rwf for dried or powder per kg. The selling price for canned mushrooms is 1000 rwf for 400 gr. Both types of mushrooms are preferred by the customers but mostly fresh mushroom.



Picture 5: Interview with Simba supermarket

To be a supplier of simba supermarket, the requirement is to have good quality of mushrooms means big size, fresh and cleaned, and not spoiled.

On average, they need at least 7kg of mushrooms every day of fresh mushrooms. For the processed mushrooms, interviewee does not know the demand.

Before buying unprocessed mushrooms, he looks at the freshness, hygiene of mushrooms and their packaging, colour, size, not shrinkage and if mushrooms are not spoiled. For the processed mushrooms, he/she verifies mushrooms if are not expired. Locally produced mushrooms are preferred than imported mushrooms

## **(II) Interview with the KIME ltd SUPERMARKET (Seller of fruits and vegetables)/Nyarugenge District**

Varieties of mushroom they sell is Oyster mushrooms

Types of mushrooms they sell and the origin:

- fresh mushrooms produced in Rwanda
- processed mushroom/canned from china

Categories of suppliers the reasons

- big company who supplied canned mushrooms
- He got fresh mushrooms (oyster) from the open market of Nyabugogo



Picture 6: Interview with KIME supermarket

Mobile phone is the mean of communication and restaurant pay its supplier immediately. He got locally produced mushrooms the open market. For canned mushrooms are supplied by the big company. Buying price of fresh mushrooms is 1500 rwf per kg and 800 rwf per 400 gr of canned mushrooms. The selling price of fresh mushrooms is 2000 rwf and 1000 rwf for 400gr of canned mushrooms.

Fresh mushrooms are preferred mostly by the customers than canned mushrooms. Because they are locally produced.

The requirements to be a supplier of this supermarket, good quality of mushrooms like freshness, free of insect, hygiene, whole mushroom with the cap and stem. They need at least 5kg of fresh mushrooms every week.

Before buying fresh mushrooms, he looks at the freshness, hygiene of mushrooms and their packaging, colour, size, not spoiled and not attacked by insects. Mushrooms with the cap and its stems. No challenges faced in the marketing of mushrooms.

## Appendix 18: Interview with Restaurants

### (i) Interview with the Manager of CORNER VIEW GENERAL TRADE LTD

Restaurant sells two types of mushrooms:

- Cultivated mushrooms/Fresh mushrooms grown in Rwanda
- Processed mushroom canned imported from outside of Rwanda

The categories of suppliers and the reason for choosing this supplier

- Canned mushrooms are from the supermarkets
- Fresh/cultivated mushrooms from the farmers

A supplier must be a group of farmers or a company and must supply good quality of mushrooms.

Mean of communication with the supplier is mobile phone. And the relationship based on the trust. Fresh mushrooms are supplied by the growers whereas restaurant got canned mushrooms the supermarkets. The buying price is 1700 rwf per kg of fresh mushrooms and 1000 rwf per kg of canned mushrooms. The selling price is 20000 rwf per one kg of prepared mushrooms. Both fresh and canned mushrooms are preferred because restaurant prepares mushrooms soups.

To be a supplier of this restaurant, good quality of mushrooms (big size, fresh and not dirty and not spoiled), regular supply are the requirements.

Restaurant needs mushrooms every day. But on average, they need at least 5kg of mushrooms every week. Because they use mushroom soup in the morning only.

Before buying of fresh mushrooms, he looks at its freshness, hygiene of mushrooms and their packaging, colour, size, and if mushrooms are not spoiled. For the processed mushrooms expiration date is verified.

Challenges faced in the marketing of mushrooms:

Fresh mushrooms are difficult to keep for a long time. In order farmers can sell the mushroom at good price, there is a need of sensitization and promotion the mushrooms so that Rwandan people can know the importance of eating mushrooms.

### (ii) Interview with the Manager of KARIBU RESTAURANT

Restaurant sells cultivated mushrooms grown in Rwanda. Its supplier is a person who gets the mushrooms from different places of Ruhengeli and brings to this restaurant.

They choose this supplier because of good price. To be a supplier of this restaurant; the farmers bring the request and then restaurant chooses the one who has lower price.

Agreement related to method of the payment and time delivery can be either in written or not, it depends on the choice of the supplier.

The mean of communication is mobile phone. The relationship between restaurant and the supplier is formal.

The buying price of the restaurant is 1500 RWF per kg and the selling price after preparation into food dishes is approximately 20000 rwf per kg.

*The requirements of being the supplier of this restaurant, a farmer has to come to negotiate with the manager about price and time delivery. The good quality is the main requirement.*

They need small quantity of mushrooms every day. But on average, *restaurant needs at least 10 kg of mushrooms per month.*

Preferred quality restaurant looking before buying the mushrooms are the Freshness, hygiene of mushrooms and the container, colour, free of insect and other unwanted materials, not spoiled and not refrigerated.

### **(iii) Interview with the Manager of the CAMELLIA RESTAURANT/Nyarugenge District**

Variety of mushroom restaurant sells is Oyster mushrooms. Restaurant sells two types of mushrooms such as unprocessed mushrooms or fresh mushroom produced in Rwanda. The second type is processed or canned mushroom from china. There two categories of suppliers such as supermarkets who supplied canned mushrooms and a group of farmers who supplied fresh mushrooms. They choose this supplier because he/she supplies the mushrooms at good quality. For them they consider the quality not price. Communication is mobile phone. The buying price of fresh mushrooms for the restaurant is 1500 rwf per kg and 800 rwf for 400 gr of canned mushrooms. In order to be a supplier of the restaurant, better quality of the mushrooms is the requirement.

Restaurant needs fresh mushrooms every day at least 3kg.

Before buying the mushrooms, he has to see if mushrooms are fresh, hygiene of mushrooms and their packaging, not shrinkage and if mushrooms are not spoiled. For the processed mushrooms, he/she verifies mushrooms if are not expired.

### **(v) Interview with the Manager of the ROSTY RESTAURANT**

He doesn't know the variety of mushroom Restaurant sells. It sells two types of mushrooms; fresh mushrooms grown in Rwanda and imported mushrooms from china. Restaurant has two categories of suppliers which are supermarkets supplied canned mushrooms and a group of farmer who supplied the fresh mushrooms. They choose this supplier because he/she supplies the mushrooms at good price, regular supply.

Mean of communication is mobile phone and the relationship between restaurant and the supplier is mutual understanding. Restaurant is satisfied with its suppliers. The buying price of fresh mushrooms is 1500 rwf per kg and 900 rwf for 400 gr of canned mushrooms. Both types of mushrooms are preferred by the customers. The selling price for one kg is not known. The requirements to be a supplier of the fresh mushroom is to have a good quality, low price, meeting time delivery and quantity. They need mushrooms at least 4 kg of fresh mushrooms every day. Preferred quality before buying the mushrooms is the freshness, hygiene of mushrooms and their packaging, colour, size, not shrinkage and if mushrooms are not spoiled. For the processed mushrooms, he/she verifies mushrooms if are not expired.

Challenges faced in the marketing of mushrooms:

It is difficulty to conserve fresh mushrooms for long time.

## **Appendix 19: Interview with the Processors**

Two processors were interviewed in order to find out their source of fresh mushroom, requirements to be a supplier, their opinion on the price the farmer given on the mushrooms,

selling and buying price of mushrooms, challenges encountered, and how farmers can sell the mushroom at better price.

**(i) Interview With PPCC Rengera Ubuzima Processor- Kicukiro**

She got the mushrooms from her farm and their clients of mushroom tubes.

Her suppliers have to buy the mushroom tubes from her because herself she is a seed multiplier as well as mushroom grower. In case they lack where to sell she paid them 1000 RWF per kg. The mushrooms must be fresh, not dirty or spoiled.

The selling price of dried mushrooms is 15,000 RWF for one kilo of and 20,000 RWF for one kg of mushroom powder.

Challenges: She lacks modern drier and grinder so that she can expand the markets. She lacks information on the shelf life of dried mushrooms as well as the conditions of storage.

This challenge affect her because she got a loss.

Supporters and services providing:

Private Sector Federation (PSF). PSF links her to the internal markets and she is still looking to improve the packaging so that she can deliver dried mushrooms to the markets.

**(ii) Interview with BN Producers/Processor**

BN Producers got the mushrooms from his farm and the farmers who bought the mushroom tubes from him.

The suppliers must be a cooperative or individual farmers who got training from him and after training bought the mushroom tubes from him. After buying the mushroom tubes under the contract farmers buy the mushroom seed from him (BN) in case they lack the markets they bring back their harvest to sell to him at 1000 rwf. Communication is done by phone. His customers are the supermarkets. The demand of fresh mushrooms depends on the demand of markets. She sells 10,000 FRW for one kilo of dried mushrooms and 20, 0000 RWF

Challenges: Cultivated mushrooms are not known by many people because it is still new. It is difficult for them to sensitize and advertise the mushrooms because it requires the money.

Supporters and services providing: RAB provides trainings on mushroom





Picture 6: Interview with BN producers

cultivation and mushroom tube production and RBS provides license on quality standards. Government should support the farmers who are in this sector so that they can advertise and sensitize the mushrooms on the radio, TV and other media as it is done to other crops.

Once questionnaire and checklist of interview have been set, the next step is to check if all the research questions were covered. Therefore, this table is to check if all the research questions are covered by the interview questions and questionnaire questions.

## Appendix 20: Interview questions, questionnaire questions, key informants and respondents, methods and tools used.

Table of interview questions, questionnaire questions, source of information, methods and tools to use

Main questions	Sub questions	Questions and checklist of interview questions for the Respondents and Interviewees	Key informants and Respondents	Methods and Tools
1	1.1	-Who are your stakeholders in the mushroom business?	-Ministry of Agriculture, Ministry of Trade and Industry, Rwanda Cooperative Agency -Local government at the Sector level (Nyamata)	Interview- Checklist
			- Farmers	Survey- Questionnaire
		-Who are your supporters and what services they provide to you? -How do you communicate with your supporters?	-Processors	Interview- Checklist

			-Farmers	Survey- Questionnaire
		-Did you get any training about mushrooms? (i) yes; (ii) no; If yes, by who and what kind of training gained from him?	-Farmers	Survey- Questionnaire
		-What services do you offer to the mushroom cooperative farmers?	-Supporters (Ministry of Agriculture, Ministry of Trade and Industry) -Local government at the Sector level (Nyamata)	Interview- Checklist
	1.2	-How these services are delivered to the mushroom cooperative farmers?	-Supporters (Ministry of Agriculture, Ministry of Trade and Industry, Rwanda Agriculture Board, Rwanda Cooperative Agency, Person in charge of cooperative at the sector level)	Interview- Checklist
		-How do you communicate with your customers? Mouth to mouth; (ii) mobile phone; (iii) other (specify)	-Farmers	Survey- Questionnaire

		-Who provides to you market information?  (i) None; (ii) Duhuze cooperative management; (iii) others Specify.....	- Farmers	Survey- Questionnaire
		-How do you communicate with your suppliers?	-Retailers (supermarkets, open markets, hotels and restaurants) -Processors	Interview- Checklist
			-How much money do you sell one Kg of mushroom?	-Farmers -supermarkets, open markets
	1.3	-How much money do you purchase for one kilo of mushrooms?	-hotels, open markets, restaurants, processors	Survey- Questionnaire Interview- Checklist
	1.4	-How many production cycle do you have in a year? (i) once; (ii) twice, (iii) thrice ;(iv) four times -How much do you invest in each production cycle?  -What are the output/sales from each production cycle? -How much do you invest in each production cycle?	-Farmers	Interview- Checklist



	<p>(vi) Others (specify).....</p> <p>State the location of your buyer:.....</p> <p>-On average, how often do your customers ask about the mushrooms?</p> <p>(i) None; (ii) Once in a week; (iii) twice in a week; (iv) thrice weekly; (v) monthly</p> <p>-What do you think about the price paid by your customers?</p> <p>(i) Very low; (ii) low; (iii) moderate, (iv) good</p> <p>-What variety of mushroom do you sell?</p> <p>-What types of mushrooms do you sell?</p> <p>Unprocessed (fresh)</p> <p>Processed (dried, powder, canned,)</p> <p>- How are your suppliers and how? Why this supplier?</p> <p>- How do you classify your customers?</p> <p>- How frequently do you need mushrooms and what quantity?</p> <p>- Which type of mushrooms is preferred most by</p>		<p>Survey- Questionnaire</p>
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2.	2.2	<p>- Are you aware of the quality of mushroom required by the markets?  (i) Yes <input type="checkbox"/> ; (ii) No <input type="checkbox"/></p> <p>-Are your customers satisfied with the quality of your mushrooms?  (i) Yes <input type="checkbox"/>; (ii) No <input type="checkbox"/></p> <p>- If No, why?.....</p> <p>- When do you harvest mushroom?  (i) Morning; (ii) mid-day; (iii) evening</p> <p>-Explain the why do you choose to harvest at this time?</p> <p>- How your product reach to your customers?</p> <p>-What preferred quality are you looking before buying the mushrooms?</p>	<p>-Farmers</p> <p>-Processors, hotels, restaurants, open markets</p>	<p>Survey- Questionnaire</p> <p>Interview- checklist</p>
	2.3	This question was captured in sub question 1.4		<p>Survey- Questionnaire</p> <p>Interview-</p>

				Checklist
	2.4	<p>-What can be done to improve the farmers to market their mushrooms at reasonable price?</p> <p>-Any other future plans in relation to the marketing of mushrooms?</p>	supporters	Interview- Checklist
	2.5	- In your opinion, what do you think can be a good channel to market your mushrooms at reasonable price? And why?	Farmers	Survey- Questionnaire