“Farmer Business Schools to strengthen entrepreneurship of Potato farmers in Rwanda”

Preparatory analysis for developing a Farmer Business School approach for the Rwandan Potato Sector

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MSc thesis:“Farmer Business Schools to strengthen entrepreneurship of Potato farmers in Rwanda”

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In collaboration with Centre for Development and Innovation and the Belgian Development Agency

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Preface

My passion and interest to the concept of 1. entrepreneurship , 2. the sustainable development of developing countries through, 3.doing business, 4. trade and 5. agriculture brought me to the topic and goal of this research. My personal ambition is to find key(s) to bring current entrepreneurs to the next level. To my experience and ‘belief’, I believe that the ‘new’ business approach only have long life (sustainable) by doing good. Doing good for me is, act sustainable, social, by focussing always on the quality of the product as well the people.

For developing countries this is somehow more difficult because in the informal sector farmers, entrepreneurs are acting in a different environment. My passion brought me to Rwanda, A beautiful country full of hills, a history that makes you nauseous but also optimistic. The local people have a strong power to rebuild their country with all competences they have. For me this was very inspiring to experience. With two great translators; Celestin and Jeannette. Together we were an unbeatable team to bring this research to this point. I especially want to thank them because they inspired me, taught me things about life and showed who I am and I try to show them my view on life.

I firstly want to thank Liesbeth Dries who supported me and gave me the crucial feedback. I want to thank Ted Schrader, because he made this thesis possible for me and give me the key to enter Rwanda. I want to thank Raf Somers because he invited me to come to Rwanda, and Arnaud Truyens to give me a comfortable place to stay at a beautiful spot in Kigali. And of course my translators Celestin Iyakaremye and Jeannette Murekatete, because without them I wouldn’t be able to work and have a great time. And I want to thank all the facilitators and farmers and the people from RAB, BTC and CDI and other organisation that helped me or are part of the study during the research.

And of course I want to thank my family and friends, especially my parents, Gert and Monique, my brother and sisters, Jurjen, Sarith and Mariska who always supported me. My girlfriend Judith Hulst, she always believed in me and supported me every day. And my friends with whom I had good discussions and good feedback during writing my thesis but also always supported me during the studies.

I hope this thesis will inspire people to implement or to start further research.

Summary

The objective of this research is to identify the present state of entrepreneurial orientation and market orientation of potato farmers in Rwanda and to identify the deficits that could be minimised by a Farmer Business School approach. Entrepreneurial orientation (EO) is characterised as a behaviour or attitude that describes the processes, practices and decision-making activities that can lead to new entries like innovations, post-harvest activities or non-agricultural activities. To measure the EO seven dimensions are used that result to a degree of business performance. The dimensions are; learning orientation, achievement orientation, autonomy orientation, competitive aggressiveness, innovativeness, risk-taking and personal initiative. MO is characterised by farmers that understand how to change their strategy in response to customer preferences and competitor strategies. MO farmers are active in the value chain, cooperate with customers and are likely to be sustainable driven. The determinants are found in farmer characteristics and resource endowments. Farmer characteristics can determine the decision-making behaviour looking to the human capital while the resource endowments can determine the decision making looking to the possibilities of access to infrastructure and assets to integrate into the value chain.

The data was collected using a quantitative survey among 181 participants in Farmer Field Schools in five districts and qualitative research based on ten focus group discussions and ten semi-structured interviews with key informants. The attitude of farmers towards entrepreneurship is significantly positive. However, according the results from the qualitative and quantitative data, the entrepreneurial attitude in terms of MO is underdeveloped. The research therefore concludes that there is a role to be played for Farmer Business Schools. Due to the small scale of potato farmers, a recommendation is to set up FBS committees or cooperatives owned and operated by farmers that stimulate the market orientation of the farmers. By further integrating farmers into the value chain and by moving their activities from the informal sector to the formal sector, more economic opportunities will present themselves. This report is useful to institutions that work with farmers to improve their economic livelihoods.

The determinants described in the quantitative analysis and qualitative analysis partly influence the attitude of entrepreneurship. Differences are seen by various outcomes according the dimensions of EO and MO from the result. Furthermore there are significant relationships between the resource endowments and farmer characteristics according the linear regression of EO and MO. Farmer characteristics partly determine the EO while the resource endowments partly determine EO as well MO. From the quantitative data the following determinants are strongly present. Men and farmers that at least finished their primary school are more likely to have an entrepreneurial attitude. The distance to market determines the willingness of farmers to find new opportunities and realise more profit. The size of the field is important to become more entrepreneurial and market oriented. Because farmers in developing countries are risk averse by default I have seen it is necessary to have quality soils as well as quality seed. It is important to grow different crops to rotate. When the soil faces less diseases and viruses, farmers are better capable to deal with the environmental hazards.

From the descriptive tables is analysed that the diversity is strongly present. This means that it is important to invest in a FBS that focus on the diversity of these farmers. To accomplish economies of scale the strong instrument of cooperatives or farmer associations could be further developed. Another recommendation is to start ‘market oriented committees’ to bring market oriented farmers and leaders of different FFS groups together to stimulate cooperation and sell their crops together at the right markets. Strong cooperatives, association or committees can share the risks and cope with common difficulties by working and transport the potatoes together to decline these challenges of bad market access and high transaction costs. Long distances cause high input costs, lower output prices, fewer buyers, weak access to supporting services and less opportunities to add value. Good entrepreneurial competences are funded by the right entrepreneurial attitude.

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Abbreviations

BTC:	Belgian Development Agency
EO:	Entrepreneurial Orienation
FBS:	Farmer Business School
FFS:	Farmer Field School
MO:	Market Orientation
N:	Number
PPP:	Public Private Partnerships
RAB:	Rwanda Agricultural Board
SPAT 2:	Strategic Plan for Agricultural Transformation

1. Introduction

1.1 Background

Growth in the agricultural sector is recognized as one of the main pathways towards sustainable development and poverty reduction (World Bank, 2008). Improving the economic performance of smallholder farmers can be achieved through increasing productivity, improving agricultural techniques and using productive resources more efficiently (Asfaw et al., 2012; Christiaensen et al., 2011; Kassie et al., 2011). Farmer Field Schools (FFS) have been set up in many developing countries to improve these production-related farming skills. FFS work with selected farmers that are trained to become facilitators of a group of farmers - preferably in a non-formal setting - to improve farm business skills following the ‘learning by doing’ principle (Taylor et al., 2012). Studies have found positive effects of FFS on improved household food security and confidence of farmers to sustain their households (Duveskog et al., 2011). This research will look to the possibilities to make a next step towards market orientation. By taking into account the current development stage of the farmers participating in FFS, the deficits in entrepreneurial and market orientation can be minimised through Farmer Business Skills.

Apart from improved farm production skills, farmers need to be able to identify and act on (new) market opportunities. Many farmers in developing countries are production oriented instead of value chain oriented; a stronger market orientation can help to develop their business (Giuliani et al. 2005; Schmitz 2005; Pietrobelli et al. 2011; Gouët et al. 2012). An important barrier to becoming more value chain oriented is the lack of external linkages that can improve added value production and processes and unstable or unclear connections to markets (Giuliani et al. 2005; Pietrobelli et al. 2011). Farmers are often not aware of the different players in market systems, on and around agri-food value chains, and how information from and interaction with these players can positively influence their business. A lack of information about the market negatively affects the decisions of farmers because they do not know about potential value improvements through innovations or new market opportunities (Schmitz 2005; Kassie et al. 2011). Better connections and improved collaboration among stakeholders within the value chain create better performance and market opportunities, improve business skills and increase farm opportunities (Gouët et al. 2012). Hence, the challenge is to move beyond production-push and link farmers to market-pull value chain dynamics. Improved market orientation of farmers, and enhanced entrepreneurial skills can integrate farmers more profitably in value chains and let them earn higher incomes.

After two decades of experiences with FFS, focusing on production, the concept of Farmer Business Schools (FBS) is emerging to address the need to focus on consumer demand and market dynamics. FBS are in fact a logical extension of FFS (Braun et al., 2006). The combination of FFS and FBS makes it possible to (1) improve orientation on entrepreneurial capacities and market demand and (2) to move back and forth between production-push and market-pull value chain development dynamics. FBS focus on post-harvest activities, processing and market linkages in a participatory way and contribute to the empowerment of farmers through improved business skills and enhanced access to local and regional markets (Konuma, 2011).

The Rwanda Agricultural Board (RAB) and the Belgian Development Agency (BTC) are implementing an important support program for the Strategic Plan for Agricultural Transformation (SPAT 2). This program has two major components: seed sector development and agricultural advisory services, of which FFS is a part. The support program wants to explore how the current FFS approach can evolve and integrate elements of FBS. The current research is realized in collaboration with staff of RAB and BTC and their related programmes and with students of Rwandan Universities. The focus of the support program will be on Irish potato farmers in Rwanda because this sector is seen as essential on the agenda of the Rwandan government.

From 2007 onwards an agricultural transformation took place in Rwanda as a result of complementary investments in irrigation, crop intensification programs and FFS (program, 2012). The introduction of better seeds and fertilizers resulted in higher yields. Following the agricultural transformation of 2007, potatoes are now in the top 10 of crops produced in Rwanda (IPAR, 2009) and the crop is grown on 10% of the cultivated area. Especially in the North of the country, the potato is important for food security and farmer incomes. Figure 1.1 shows the increase in potato production in Rwanda since 2007. In terms of market orientation, the focus on the Irish potato crop is interesting because it is a subsistence crop but also as a cash crop depending on the variety which is produced (Personal observation, June 2013). Apart from commercial outlets on the domestic market, the Irish potato is also exported to Burundi, Tanzania, Uganda and the Democratic Republic of Congo.

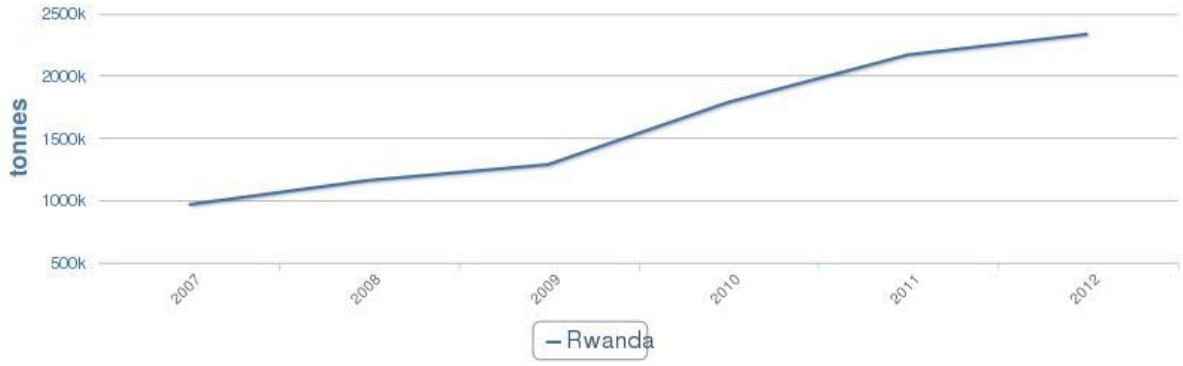


Figure 1.1 Production of potatoes in Rwanda (FAOSTAT 2013)

1.2 Research Objective

This thesis research focus on preparatory activities to develop an appropriate FBS approach in Rwanda. The research gap of this study is to find new ways to further integrate the farmers into the value chain. Further integration might stimulate the development of farmers through an improved behaviour towards market orientation. Market orientation will focus on market dynamics and consumer demand. By analysing the current entrepreneurial attitude the gaps might indicate further development opportunities to address through a FBS. This allows for geographic focus and in-depth analysis of EO and MO of farmers.

The research objective of this thesis is to *Identify the present state of entrepreneurial orientation and market orientation of potato farmers in Rwanda and to address deficits that could be minimised by a Farmer Business School approach.*

This overall research objective will be analysed through four interdependent sub-questions:

1) How are the concepts of entrepreneurial orientation and market orientation defined in a developing country context?
2) What is the diversity in entrepreneurial- and market orientation in the Rwandan potato sector based on the dimensions of entrepreneurial orientation and market orientation?
3) What explains the diversity in entrepreneurial orientation and market orientation of potato farmers in Rwanda?
4) What recommendations can be made for the development of FBS to improve the entrepreneurial competences of Rwandan potato farmers?

The thesis endeavours to answer these questions that could be relevant to the development of an appropriate FBS approach in Rwanda. Moreover the thesis tries to indicate how FBS can improve farmers’ entrepreneurial development. With the identified gaps in entrepreneurial attitude for different farmer types, a suggestion will be made for recommendations about the target groups for FBS.

Each of the chapters in the thesis will elaborate on one of the four research questions. The second chapter will focus on the concept of entrepreneurship (Becx et al., 2012). Many definitions of entrepreneurship exist in the literature depending on the context, culture, geographical area and dimensions (Bruton et al., 2008; Lans et al., 2008; McElwee, 2006). The importance of the context for defining entrepreneurship will be addressed in this chapter 2. Specific attention will be given to the development of a working definition of entrepreneurship – and more specifically the dimensions of entrepreneurial orientation (EO) and market orientation (MO) – in the context of a developing country. This definition will form the basis for the research in the remaining chapters of the thesis. The remainder of the thesis will focus on the empirical application of the concepts that are discussed in chapter 2. Therefore, the third chapter will discuss the methodological design and the data collection process. In the 1st part of the fourth chapter the current state of EO and MO of potato farmers in Rwanda is analysed. The data for this analysis are collected through a farmer’s survey. Quantitative evidence from the farmers survey is complemented by qualitative evidence from focus group discussions and interviews with farmers. In the second part of chapter 5, the survey data are used to address the question of diversity in EO and MO in the Rwandan potato sector. Determinants of diversity include gender and resource endowment. The identification of the diversity in EO and MO based on farm and household characteristics may lead to interesting insights that are relevant for the set-up of FBS programs and the farmers or farmer groups that they could target. The sixth chapter discuss the EO and MO on the basis of statements according to the dimensions and determinants that influence the potato farmers. Recommendation will be given about suggestions and how to use the results into implementation. In line with the scope of FBS, we will focus mainly on post-harvest, processing and market competences and behaviour that can improve entrepreneurship (Nyamulinda et al., 2011)(Lans et al., 2008).

2. Farmers in developing countries and entrepreneurship

Entrepreneurship is a predisposition and it means to own and manage a business and see business opportunities to scale (Acs, 2006; Naudé, 2010). Because many definitions exist, entrepreneurship can be analysed in different ways. In order to understand this concept the chapter is divided in several parts. First, the complexity of the concept entrepreneurship will be explained. Then this concept will be applied in a developing world context to derive a suitable definition for the case of this research. A distinction will be made between Entrepreneurial Orientation (EO) and Market Orientation (MO). EO and MO will be described using the dimensions of EO and MO. After describing EO and MO the market-access, innovation and risk-taking is explained because this is an important factor that influence the attitude and business performance of the farmers that should be taken into account looking to the EO and MO. This business performance relies on attitude but also on the determinants that is explained at the end. Thus, at the end the determinants are described that relates to EO and MO to discuss the determinants that could influence EO or MO.

2.1 Entrepreneurship a complex concept

Running a small business and being an entrepreneur is not the same thing (Bruton et al., 2008; McElwee, 2005, 2006). Running a business requires different skills and abilities than those required for being an entrepreneur. Running a successful long-term business requires managerial and strategic skills. While being an entrepreneur requires innovative skills in markets and products, proactive decision making, aggressive competition and risk taking (Díaz-Pichardo et al., 2012; McElwee, 2006). Because entrepreneurship is context related it is necessary to give an explanation of this complex definition within the context of this research. Context is important for understanding when, how and why entrepreneurship happens and who is or becomes involved. As the context changes, entrepreneurship can also change dramatically (Welter, 2011).

Carree (2005) Describes three entrepreneurial roles, emphasized by Schumpeter, Kirzner and Knight (Carree and Thurik, 2005). The first role defined by Schumpeter is the innovator, “*he or she carries out new combinations (production activities) we call enterprise; the individuals whose function is to carry them out we call entrepreneurs”* the second role by Kirzner is the role of perceiving profit opportunities. The third role is associated with uncertainty, and an entrepreneur is someone taking risks which refers to Knightian entrepreneurship (neo-classical entrepreneur). Carrees combines these three roles and defines entrepreneurship as follows: “*Entrepreneurship is the manifest ability and willingness of individuals, on their own, in teams, within and outside existing organisations to perceive and create new economic opportunities (new products, new production methods, new organisational schemes and new product-market combinations), and to introduce their ideas in the market, in the face of uncertainty and other obstacles, by making decisions on location, form and the use of resources and institutions”.* Essentially, entrepreneurship is a behavioural characteristic of persons and not an occupation. Entrepreneurial activities can be seen in phases in a career or as part of certain activities, depending on the context. The phases in the career can be professionalised by developing competences. By developing competences farmers can develop from novice to professional entrepreneurs (Lans, 2009).

2.2 Entrepreneurship in developing countries

In developing countries most entrepreneurs start out of necessity[1] (Naudé, 2010; Poschke, 2013). Hausmann and Rodric (2003) perceive necessity entrepreneurs positively when they are productive, because entrepreneurship can be a way out of poverty and an investment in future development (Díaz-Pichardo et al., 2012; Hauser et al., 2010; Hausmann and Rodrik, 2003). Entrepreneurship is about planned production for a defined market with a profit objective. This goal can be reached

[1] Necessity entrepreneurs and opportunity entrepreneurs explain two types of entrepreneurship. Another common concept is subsistence farmers vs. commercial farmers. Subsistence farmer is more related to necessity farmers and commercial farmers are more related to opportunity entrepreneurs.

through generating entrepreneurial skills and knowledge and executing these will lead to growth and development (Becx et al., 2012; Naudé, 2011).

Farmer entrepreneurship in developing countries in terms of the level of entrepreneurship, is by looking at necessity versus entrepreneurial farmers. Necessity farmers are “farmers as farmers” who are mainly focused on low cost price, avoid differentiation, avoid risk, and have little awareness of market developments. The second type of farmers are “farmers as entrepreneurs”. This group is constantly focussed on possible agricultural opportunities, exploits non-farming activities, has an awareness of new developments (innovation) and, takes risks to develop (McElwee, 2008).

The distinction between necessity and entrepreneurial farms is important. Naudé (Naudé, 2010) states that necessity entrepreneurship can undermine economic development. Although necessity entrepreneurs are survivalists and play an important role in poverty alleviation, this way of entrepreneurship has a low growth potential and is unlikely to lead to high potential entrepreneurship. Therefore, Naudée argues that efforts to stimulate economic growth should be focused on the farmers as entrepreneurs.

There are differences in characteristics of entrepreneurship in west European countries compared to developing countries. Entrepreneurs in general take calculated risks to make profit, by being innovative and pro-active. Being an entrepreneur in a developing country is characterised by high risk and uncertainty due to variability in the policy framework, economic instability, and lack of insurance mechanisms. Both small and large firms face an increased risk of failure which affects the nature of the firm. Large firms have commitments to their labour and small firms to their household and the present physical capital like houses, livestock and storage (Murphy et al., 1991). Thus, smallholder farmers in developing countries are mostly risk-averse and make decisions for their own development taking into account food security, life security and personal and household development (Becx et al., 2012; Naudé, 2010).

An important focus in the developing country context is how a farmer can grow step by step by developing their human capital – competences. Competences in the context of entrepreneurship is a comprehensive set of skills, knowledge and attitude that is needed to pursue and identify entrepreneurial opportunities (Lans, 2009). Necessity entrepreneurs, mostly with low educational attainment, are predominantly pushed into entrepreneurship because other options for work are either absent or unsatisfactory (Acs, 2006; Naudé, 2010; Poschke, 2013). This is in conflict with the description of the previous paragraphs, because in the western concept entrepreneurship is a behaviour or predisposition and a certain business is chosen to execute by the entrepreneur. For example Dutch entrepreneurs are starting out of adventure and own choice. Highly educated Dutch starters can decide to take over the farm of their parents, while they can choose to have a more secure job and income elsewhere. Starters in developing countries do not have a choice, they want and have to make use of the land. They also need to share the field of their parents so they have very little opportunities to expand their enterprises (Lans, 2009; Scoones et al., 2010).

In the developing country context, some authors distinguish entrepreneurs on the basis of their role in the dual economy. For example, in the formal sector entrepreneurship starts out of talent, demand from the market, degree of firm size and contracts while in the informal market entrepreneurs start out of necessity as they cannot find a job in the formal sector. When more growth emerges, entrepreneurs are able to migrate to the formal sector (Murphy et al., 1991; Naudé, 2010).

2.3 Entrepreneurial Orientation and Market Orientation

We can state that entrepreneurship is a predisposition for opportunity seeking, while in developing countries entrepreneurship is often a necessity and focuses on business performance through looking for new opportunities, innovation, markets and strategies. In order to see and analyse opportunities it is key to have an appropriate strategy in order to deal with these opportunities (Lans, 2009; Naudé,

2010; Urban, 2010). ‘Farmers as entrepreneurs’, sustain and create better business performance and create competitive advantages. Entrepreneurial orientation (EO) is then a behaviour or attitude that describes these processes, practices and decision-making activities that can lead to new opportunities, innovation, markets and strategies (Lumpkin and Dess, 1996). To measure the EO Krauss et al. (2005) use seven dimensions :

- Learning orientation; Learning from experience and developing knowledge to make successful decisions.
- Achievement orientation; Entrepreneurs take responsibility for their performance and are eager for feedback, reflect and set challenging goals to constantly improve themselves.
- Autonomy orientation; Business owners value their own decision making and dislike receiving orders from others. Autonomy oriented entrepreneurs are highly motivated to realise their own ideas and realise their vision within their own constructed strategy.
- Competitive aggressiveness; Entrepreneurs are aware of competition and enjoy to play this game and want to be the best in the market.
- Innovative orientation; Entrepreneurs are open for new developments within their area of production and market opportunities.
- Risk-taking orientation; The entrepreneurial experience goes together with unavoidable risks. Risk-taking orientation focuses on the behaviour towards unavoidable challenges and risks.
- Personal initiative; An entrepreneur needs to be pro-active, independent, and is the leader of shaping the environmental conditions.

Market orientation (MO) is another aspect of entrepreneurship that contributes to higher performance. Market oriented farmers are better informed about the market and perform better. MO farmers ultimately focus on learning and adapting environmental changes and diversities to understand how to change their strategy in response to customer preferences and competitor strategies (Boso et al., 2013; Verhees et al., 2012). EO positively influences MO, EO stimulates the identification and exploitation of opportunities while MO is critically analysing how to improve market access (Li et al., 2008; Merlo and Auh, 2009). What we see from the Netherlands for example is that small MO farmers focus on value adding activities. MO farmers are less likely to focus on reducing costs and prices but try to integrate in the value chain by adding new activities and cooperate with customers.

MO is a competence that is connected to the dimensions of EO and in developing countries one of the returning constraints for EO. The sub competences of MO are; (page 55 (Obi, 2010));

- Supplying necessary goods; Understanding the market demand, are there possibilities on post-harvest activities or processing.
- Searching for potential buyers; Where are the markets of the farmers. What distance is the farmer able to travel regarding the production costs and market prices
- Negotiating power; Is the farmer able to bargain, does he make use of farmer cooperation or groups,
- Enforcing contracts; Contracts with wholesalers or traders can give more income safety
- Monitoring; Understand what the market is demanding by “visiting markets” pro-actively, so the threshold of production costs and market price become positive. Thus what are market requirements and opportunities, quantity demanded, consumer preferences? And how does value chain act in the Irish potato sector
- Sell good quality; The farmer is able to sell good quality products; The farmer is eager to be the best (competitive aggressiveness).
- Transaction costs: How does the farmer deal with transaction costs.

2.4 Market access

It is widely accepted that market access is an important factor for an entrepreneurial farmer to achieve the profit objective and business performance (Baker and Sinkula, 2009; Boso et al., 2013). The market access influence the market orientation positively and negatively. Nevertheless the concept of market access is debatable, what is “good access” or “poor access” and how can we define this in the

context of Rwanda and this study. One of the most common constraints of entrepreneurial farmers acting in informal market is to execute their entrepreneurial activities and develop their competences without a sufficient access to markets (Chamberlin and Jayne, 2013b; Markelova et al., 2009). Because of the physical transportation to the markets, the distance is most of the time already the threshold for business performance and adoption of new techniques (Langyintuo and Mungoma, 2008). This distance causes higher input costs, lower output prices, fewer buyers to add value to production, and weak access to supporting services. Those are common causes that keep the farmers in chronic poverty (Chamberlin and Jayne, 2013b). Telecommunications technology can have a positive impact on market access because of good market information and the improvement of network accessibility show that mobile phone coverage in Uganda encouraged the market participation of farmers that are located in remote areas (Muto and Yamano, 2009).

Markets can be grouped into formal and informal markets. Informal markets embrace unofficial transactions between farmers and consumers. Formal markets have clearly defined standards for quality, safety and prices. For smallholder farmers it is difficult to penetrate into the formal market due to high transaction costs. Transaction costs are observable and non-observable costs associated with enforcing and transferring property rights from one person to another. The costs also involve costs that result from high risks, missing markets and lack of collective action (Ashby et al., 2009). The transaction costs for a smallholder farmer to enter formal markets are the result of the screening of partners, weak bargaining power, monitoring and enforcement costs (Obi, 2010). These factors keep farmers away from the formal markets (Markelova et al., 2009; Obi, 2010). Missing competences for accessing markets, like how to deal with price changes also constrain farmers (Lans, 2009). Last, the experiences of farmer groups connected through Farmer Field Schools, learns that leadership is another important factor to connect to markets because leaders of a farmer group determine the success of the group on the market (Fischer and Qaim, 2012; Kaganzi et al., 2009).

Transactions costs are the main factors that distinguish the formal and the informal market, but are nevertheless highly connected. A farmer buys for example inputs from the formal market, but sells products in the informal market. The farmer in the informal market is more supply driven, while in the formal market the farmer can be more demand driven and has competences to access new product markets, resources and financial markets (Blunch et al., 2001; Charmes, 2000). Demand driven farmers see more opportunities in other products or enterprises like post-harvest and processing activities. While supply driven farmers stick more to their normal production and analyse from their doorstep (The gate of the farm). Poor market access influences the production negatively because market access is a precondition to sustain and improve production. In case of Farmer Business Schools entrepreneurial competences are necessary to enter these formal markets and take advantage of the fast growing higher value markets (Chamberlin and Jayne, 2013a; Kaganzi et al., 2009).

2.5 Innovation

Innovation is needed for long-term business success and increases the likelihood of survival (Boso et al., 2013). For the entrepreneur and the six dimensions of Lumpkin and Dess (1996) innovation is essential, but in developing countries many factors constrain the innovation process like; lack of credit, information, infrastructure, inadequate farm size, insufficient human capital, chaotic supply of inputs and risk aversion (Gershon et al., 1985). Credit is necessary to stimulate innovation and adopt and improve techniques that can improve yields and improve accessibility to markets, to buy high quality seed, high quality inputs and materials for spraying, and transport vehicles and new land (Heltberg and Tarp, 2002; Langyintuo and Mungoma, 2008). To access credit banks usually require a history record, cooperative membership and or a large amount of land (Boahene et al., 1999). Limited resource endowments constrain the innovation potential of the farmers. The distance to the market also affects revenue and accordingly the innovation process. Revenue is highly correlated with innovations. Businesses that are innovative minded demonstrate also good financial performance. Innovative minded business analyse the market and listen to the stakeholders.

A combination of a market oriented strategy and an entrepreneurial oriented strategy stimulate basic innovations. Competences that are required;

- Searching for possible innovations; pro-active approach to market developments, market developments like new techniques for irrigation.
- Social network; Social networks positively influence the development by surrounding farmers that already implemented new techniques(Gershon et al., 1985). To orientate, it is necessary to understand the roles of the actors in the value chain.
- Contact with development projects who motivate farmers to innovate. Farmers can access new information by contacting the development projects.
- Enforcing contact with suppliers; Suppliers can have new fertilizers or better seed to grow the crop. Maybe also better varieties come into the market. When a farmer is informed he can adjust and improve his planning for the field. Contract farming is a successful formula for farmers and suppliers. Although it is doubtful if it stimulates innovation.

2.6 Risk taking

People take risks because they expect a positive consequence but know that the consequence could turn out to be bad (Hardaker et al., 2004). A farmer can decide one year not to rotate, the risk is to exhaust soils and get a low yield, but the expected benefit of a higher income may be more than the negative risk of losing soil fertility. Another risk-taking approach could be to invest in better seed, the farmer expects to have better yields and less diseases and or viruses. But there is always an uncertainty of bad weather that can cause the investment to be lost. The abundance or shortage of rain or sun can damage the whole production.

Risks and uncertainties can be defined in various ways. One common distinction is to suggest that risk is imperfect knowledge where the probability to failure could be calculated or indicated (Wiklund and Shepherd, 2005), while for uncertainties this probability is unknown. Especially in developing countries farmers have to deal with uncertainties because they do not have the sophisticated knowledge to calculate risks, and therefore risks become an uncertainty (Hardaker et al., 2004). Eenhoorn and Becx (Eenhoorn and Becx, 2009) described risks as uncertainties faced by farmers. Smallholder farmers try to empower themselves against risks and uncertainties and say *“an entrepreneur is the person who risks losses and earns profit”*. An entrepreneur always tries to make a profit, but based on his knowledge he will never know beforehand whether he will have success or failures. By doing a risk analysis a farmer can make decisions on the production process and the investments in his field (Eenhoorn and Becx, 2009). Living in a risky environment is associated with less entrepreneurial orientation (Heltberg and Tarp, 2002). In areas where insurance and credit markets are absent, farmers become more risk averse and adopt secure but low yielding technologies to lower the risk of losing yields. The degree of taking risks is often determined by the wealth of a household or farmer, ownership of transport or improved access to roads (Heltberg and Tarp, 2002).

2.7 Determinants of entrepreneurial orientation and market orientation

This paragraph discusses the determinants of EO and MO. Determinants include farmer characteristics like gender, age, literacy level, educational level and level of farm experience and resource endowments such as land size, assets, livestock units and also social capital endowments. While farmer characteristics and endowments may motivate or hinder EO and MO there may also be factors external to the farm household that affect the opportunities for entrepreneurial or market activities for the farmer. For instance, the location of the farm – e.g. distance to the market – could be a barrier to market access and therefore lower the opportunities of farmers to be market oriented (Wiklund and Shepherd, 2005).

2.7.1 Farmer characteristics

Several studies point to the role of gender in explaining EO. Women seem to make other decisions than men that can have an effect on entrepreneurial orientation (Fischer and Qaim, 2012). Women are found to be less entrepreneurial than men. One reason for this observation is that female entrepreneurs tend to be more risk averse than male entrepreneurs. Women choose to adopt slow

growth strategies to keep control over the business while men are more looking for new opportunities and are less risk averse (Amine and Staub, 2009; Saito et al., 1994).

Furthermore, age is an important determinant. Young entrepreneurs adopt new techniques more easily than their older colleagues because the general belief is that older farmers are less willing to change (Langyintuo and Mungoma, 2008). On the other hand, age is positively correlated with experience. More experienced farmers are better able to adopt new strategies, enter new markets or innovate than inexperienced farmers (Boahene et al., 1999). Whereas farmers with more experience understand the necessity of ‘learning by doing’, competitive aggressiveness and other dimensions of EO may be linked more to younger farmers.

The literacy level is important for communication. Farmers can interact better when their communication skills and literacy level are understandable. The ability to read also determines the adaptation capability, because when a farmer is able to read books or information booklets, the farmer can improve techniques based on the acquired knowledge (Langyintuo and Mungoma, 2008). The literacy level is also necessary for good networking, communication and record keeping. Record keeping is the ability to track performance of the farm over time. Banks and other financial institutions make choices based on the performance and financial history reports. This determinant is closely related with some competences of EO like for example enforcing contracts and monitoring (Sanginga et al., 2004).

Networking is the active maintenance and acquisition of contacts and relations with stakeholders. The network of the farmer influences the ability to become an entrepreneur. A good environment can stimulate farmers to improve their activities. For instance, working in a group and good contacts with extension officers can have a positive impact on development and access to markets and finance (Boahene et al., 1999; Chamberlin and Jayne, 2013a).

2.7.2 Resource endowments and environmental determinants

Another important aspect to entrepreneurial development is the business environment of the farmer in a developing country. On household and firm level the theory is that the firms or businesses are focused on utility and profit maximizing that face budget and production constraints. The production that takes place in the informal sector is part for the market and household consumption. The entrepreneurial farmer is mostly risk averse, which affect their willingness to diversify and explore possible profitable opportunities. Murphy (Murphy et al., 1991) says that the most ablest and talented people become entrepreneur. People, however, are by nature rent seeking, so abler people will only become entrepreneur when there is more productive opportunity for them than for others. The abler entrepreneurs can earn more than proportionately to their ability, from operating the same technology as the less able entrepreneurs. Because of their increasing return to ability(Murphy et al., 1991). Also the contrast between the abundance of workers and the shortage of entrepreneurs will outbalance the problem (farmers with no opportunities to work) and the ablest workers will become entrepreneurs. Likewise will the firm size give these entrepreneurs a better start to accumulate economies of scale. The agricultural situation is different and maybe even constraining the entrepreneurial farmers because of a shortage of land and too many farmers acting on the same market. The demand for agro products is more than enough but the resource endowments to produce are scarce and the human capital is inadequate.

In Sub-Sahara Africa the poor more regularly live in high-risk and low-yield areas, and own fewer basic farm capital goods. Therefore, it is key to their development to increase productivity and market and value chain integration not only for cash crops but also for basic food crops (Heltberg and Tarp, 2002). Poor farmers are often reluctant to invest in new production activities, in buying inputs or new machinery mainly due to their limited access to credit and cash. Economic theory predicts that more resource-endowed farmers, or wealthier households, have a better ability to cope with production and price risks and consequently are more willing to adopt new technologies than their poorer or less

resource-endowed counterparts (Hardaker et al., 2004; Langyintuo and Mungoma, 2008). Furthermore, the welfare level also determines the decision to produce cash crops or subsistence crops or in the case of the potato sector, the decision to produce seed potatoes or consumption potatoes. Hence, the poor can be excluded from market participation due to a lack of land and labour but also because of different behavioural responses between the poor and the wealthy (Tamvada, 2010). As a consequence, poor farmers are more likely to be subsistence oriented (Heltberg and Tarp, 2002).

The decisions a farmer takes are influenced by own characteristics, risks and resource endowments. The ability to start and run a business is partly determined by the endowment of land (Heltberg and Tarp, 2002). This allows to test new technique but also helps to gain access to credit. Access to credit improves because collateral can be provided by the land. Ownership of livestock or other assets can also be important in this respect. Well-endowed farmers own more assets such as livestock, bicycles and mobile phones (Langyintuo and Mungoma, 2008). Soil quality also plays a role as it influences the productivity of the land and hence its value. In a country like Rwanda where agricultural land is scarce, soil quality is an important determinant for development and risk-taking. We expect more entrepreneurial and market orientation among these farmers because they are better able to make decisions and develop themselves.

There are a number of factors outside of the control of the farmer or the farm household that may also constrain the farmer’s ability to become an entrepreneur. Examples include excessive regulations and insecure property right. Factors like taxes or subsidies also influence the farmer’s decision-making process. Distance to the market is another determinant of the entrepreneurial capability of the farmer. The further away from the market, the more difficult the access of the farmer to quality seeds, inputs and information about prices of crops. Also farmers become more dependent on middlemen like traders. Access to mobile phones can, at least partly, help to overcome the constraint of distant markets. A better connection with the value chain means that information about markets, finance and innovation can improve the EO and MO. Own means of transport can reduce the difficulties of farmers to visit markets (Eenhoorn and Becx, 2009; Hardaker et al., 2004; Muto and Yamano, 2009).

2.8 Conclusion

Several angles on this research objective are discussed according to the literature. We can summarise that entrepreneurship in the western world is a predisposition for opportunity seeking. In developing countries entrepreneurship is often a necessity and focuses on business performance through looking for new opportunities, innovation, markets and strategies. In order to see and analyse opportunities it is key to have an appropriate strategy to deal with it The business performance can be analysed through the seven dimensions of EO and MO(Lumpkin and Dess, 1996). EO and MO are characterised by the entrepreneurial attitude of the farmers towards changes in environment, opportunities and threats. EO and MO in a developing country can be analysed differently than entrepreneurs in a developed country, therefore not only market access needs to be taken into account but also determinants like personal characteristics and resource endowments that hinder or stimulate EO and or MO.

3. Methodology

The current chapter will introduce the empirical research that was done to achieve the research objective: *To identify the present state of entrepreneurial orientation and market orientation of potato farmers in Rwanda and to address deficits that can be minimised through Farmers Business Schools for the potato farmers in Rwanda.* The empirical part of this thesis will focus on the sub-question: *what is the diversity in entrepreneurial- and market orientation in the Rwandan potato sector based on the dimensions of entrepreneurial orientation and market orientation*? After analysing the determinants of the diversity in EO and MO, the discussion will focus on insights into the remaining 2 sub-questions:

1) How are the concepts of entrepreneurial orientation and market orientation defined in a developing country context?
2) What is the diversity in entrepreneurial- and market orientation in the Rwandan potato sector based on the dimensions of entrepreneurial orientation and market orientation?
3) What explains the diversity in entrepreneurial orientation and market orientation of potato farmers in Rwanda?
4) What recommendations can be made for the development of FBS to improve the entrepreneurial competences of Rwandan potato farmers?

3.1 Data collection

The research is conducted through field research, including qualitative and quantitative data collection methods: a farmer survey, focus group discussions, expert interviews. The research is done in the northern and western part of Rwanda. This part has a population of 4.340.000 in 2009 and produced 580.600 ton/kg on 48,000ha of potatoes in 2009 (data from CDI). The total number of potato farmers is around 400.000 (personal communication with Ted Schrader, 2013).

Potato sector Rwanda

In Rwanda the agricultural development is considered as key to economic growth. 1,12 million hectares (ha) of the land is cultivated which is around 46% of the total area. The Cultivated land is still growing each year. At this moment the majority of the population lives in the rural areas growing 870.000 ha of annual crops and 250.000 ha of permanent crops. The Ministry of Agriculture and Animal Resources (MINAGRI) foresee many possibilities in Agriculture. The mission of MINAGRI is: *“Agricultural outputs and incomes increased under sustainable production systems and for all groups of farmers, and food security ensured for all the population” (MINAGRI website (April, 2013)).*

The potato sector is the fastest growing food crop in Sub-Saharan Africa. This trend has been the same in Asian countries. Especially in Ethiopia and Rwanda the potato yield per hectare increased (Midmore, 1992). The Irish Potato is an interesting crop to develop further in Sub-Saharan countries because of its high nutrition value. Potato production not only supports food security, but potato is also considered a potential cash crop. Potato is a crop that can have high yields with good seed, fertilizers, crop protection. Initiatives like FFS prove that yields increase with adding knowledge and skills. Some challenges are on the agenda to be improved which are; insufficient knowledge on the marketing of potatoes and insufficient knowledge and availability on post-harvest infrastructure, post-harvest losses due to inadequate storage facilities and practices and little interest to improve technology due to low purchasing power of African growers. One of the main obstacles in the Rwandan potato sector is the limited supply of quality seeds. Many seeds are exhausted and the Rwandan government faces difficulties to produce enough quality and certified seeds. Also in terms of costs for the farmer it is often too expensive to buy certified seed. The problems of seed supply are constraining the whole market, and therefore the farmers become more risk averse due to many diseases and viruses. Besides this they also face problems of erosion and fertility that lead to low yields. The market in Kigali is demanding more quality potatoes for consumption.

The potato areas can be found all over Rwanda but some areas have clustered potato production. The potato areas have different characteristics but most of the fields are 1800 meter above sea-level, the soils are deep, well drained and generally rich in nutrients. The best districts to produce potatoes are in the Northern province and some in the western province. The fertile volcanic soil is very suitable for potato production. Musanze is the main potato growing area. Other important districts are; Burera, Rubavu, Gakenke, Nyabihu, Gicumbi and Rulindo. In the south also Nyamagabe has many potato farmers.

The organisations mentioned in Table 3.1 are stakeholders, including development organizations, involved in developing production, post-harvest and marketing activities in the potato sector. Together – often through Public Private Partnerships (PPP) – they work to the mission of Rwanda of 2020; *“Transformation of agriculture into a productive high value, market oriented sector, with forward linkages to other sectors”.*

Table 3.1: Stakeholders potato development program

Organisation	Mission
Farm Concern	Organize farmers to better reach markets, Winning markets for smallholders
Rwandan Agricultural Board (RAB)	Policy implementers
Belgian Development Agency (BTC)	Help and support by strengthening institutional capacities
International Fertilizer Development Centre (IFDC)	Implement CATALYST II, by improving the livelihoods of smallholder farmers and others in the value chain, using the ‘market’ as key driver for agricultural intensification
Agri-Profocus	Aim to enhance coherent and demand-driven support to producer organisations and their business partners
NL Cooperation	Government of Royal Kingdom of the Netherlands support the development programs
Post harvest task force	Strengthening the harvesting, post-harvest handling, trade, storage, and marketing within staple crop value chains in Rwanda, in an effort to improve markets and linkages for farmers, and reduce post-harvest losses
Urugaga imbaraga	National farmers’ organization with strong potato groups in the target area
Banque populaire du Rwanda	Financial services
Agrico (Netherlands based seed potato company)	Support project by sharing knowledge
Private Businesses	Value adding activities or investing
Private Seed Potato Producers	Selling seed potatoes
Minagri	Responsible for Agricultural development

In 2012 a total amount of 67.276 farmers in Rwanda are members of the FFS program. Table 3.2 shows that there are 2.547 FFS groups and 1.570 facilitators. The target is to increase the number of farmers to 120.000 in 5000 groups with 2500 facilitators. The potato sector has 113 FFS facilitators, 634 groups and 17626 members. This means that on average 27 potato farmers are in one FFS group. And on average for every 5,5 groups there is 1 facilitator. BTC measured that since the FFS program started farmers have an increase in production of around 50 percent.

Selection of potato farmers for inclusion in the research was done together with RAB, and BTC. In total 182 farmers are included in the survey. The data was collected from May till the end of July 2013 in 5 districts of Rwanda. Together with two translators all the farmers were visited personally to conduct the research in a time span of 7 weeks. Farmers were selected out of five districts (in three

different provinces); Musanze, Burera, Rubavu, Gicumbi, Nyamagabe. Together with a local expert the five districts are selected based on the number of Irish potato farmers. The districts are all located within different agro-ecological zones, they have different socio-economic environments and they have different road infrastructures. Musanze, Burera and Rubavu are classified as high-potential Irish potato-growing areas because of their fertile volcanic soils. Nyamagabe and the south of Gicumbi are classified as low-potential Irish potato-growing areas because of the less fertile soils and also because these districts face problems of erosion since many years.

Table 3.2: Farmer Field School participants

	2012	Target
Number of FFS Facilitators	1.570	2.500
Number of FFS Groups	2.547	5.000
Number of Farmers in FFS	67.276	120.000
Number of Potato FFS facilitators	113	-
Number of Potato FFS groups	634	-
Number of Potato farmers in the program	17626	-

Table 3.3 shows information for the districts and the 175 selected farmers. After selecting the districts, the cells[2] are randomly chosen from the database of BTC. After this partly random selection, we asked the facilitator or the president of the FFS group to select farmers from these cells. The respondents are all members of FFS because this group is already used to training of especially farming skills. Therefore a next stage in the form of a FBS can more easily be developed.

Table 3.3: Research population overview

Province	District	Total amount of FFS in selected districts and total FFS in the district		Amount of farmers in selected districts and total amount of farmers		Selected farmers for survey (N)
North	Musanze Burera Gicumbi	118	187	3100	4978	35 35 35
West	Rubavu	91	206	2351	5408	35
South	Nyamagabe	89	183	2316	5046	35
Total		**298**	**576**	**7767**	**16432**	**175**

3.2 Research design and model

To determine the diversity in EO and MO the focus will be on analysing farmers’ attitudes. The attitude is the precursor to analyse the deficits of competence development. this makes the connection to FBS. Figure 3.1 is a representation of the steps in the research model. The focus of the research is on block 1a and 1b as an outcome from the blocks 2-4 on the right. To determine the existing level of EO and MO a factor analysis is done to group the variables from the strategy block 2. Blocks 3 and 4 are integrated to assess the determinants of EO and MO. Block 5 focus of the discussion and recommendations regarding FBS development competences.

The methods used to investigate the model empirically are: a farmer survey; focus group discussions and 10 in-depth interviews among farmers to achieve a better understanding and foundation of the research. (1) Semi-structured interviews are done to achieve a better understanding of the farmers in the northern, southern and western area. The interviews are transformed to farmer profiles and used to select quotes to provide qualitative evidence to support findings of the quantitative analysis. I have written ten farmer profiles based on semi-structured interviews. A farmer profile is a case study that shows the farmer as an actor: somebody who finds him- or herself in a certain situation and who seeks entrepreneurial opportunities.

[2] A cell is an administrative geographical location that contains a small amount number of villages. Following in this order; The order of magnitude is as follows: Country, Province, District, Sector, Cell, Village.

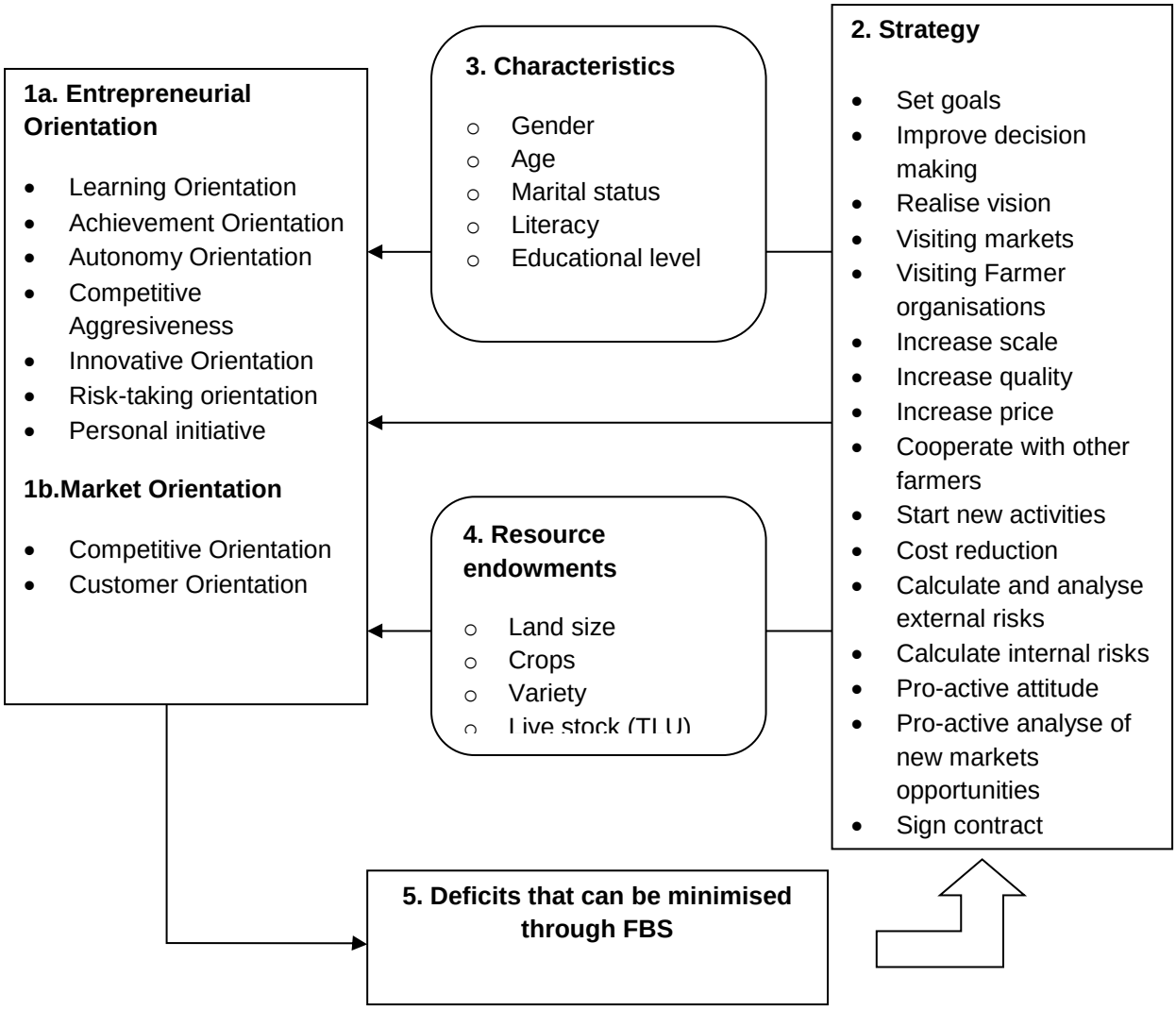


Figure 3.1 research model

Quantitative information is mostly covered in the farmer survey but will be also added in the farmer profiles to support the profile. Each farmer profile is documented in 1 to 2 pages. The farmer profiles summarize in short the attitude and determinants. At the end the farmer profiles show the living conditions of the farmer, the activities, the considerations and thoughts they have and the results obtained (both positive and negative). (2) The Survey is done among FFS farmers to collect information on the diversity of the potato farmers and the different dimensions of EO. The questionnaire is set-up in English and translated by a native Rwandan to Kinyarwanda in the field in cooperation with RAB. The questionnaire consists of 109 questions. The English version of the questionnaire is added in Annex A.1. (3) Ten Focus group discussions are used to understand what actions farmers take, how they cooperate together and how they are integrated in the value chain. The reports of the focus group discussions can be found in the annex and the quotes are used in the results to provide qualitative evidence to support findings of the quantitative analysis. The focus groups give more insights in how farmers go to the market, use the information of institutions and organisations and interact with the value chain. The focus groups will discuss openly about the dimensions to create an understanding about the farmers’ attitude towards the value chain. The discussions were conducted together with two translators that speak native Kinyarwanda. Because the discussion is done in a local language it is important to translate the discussion the same day. The focus groups were organised among FFS groups. Farmers that participated in the farm survey, did not participate with the focus groups, otherwise the possibility arose that the farmer does not fully cooperate concerning the time.

4. Qualitative results – the dimensions of entrepreneurial orientation

The results are extracted from the data obtained in the field. The diversity of the farmers will be shown by quotes from the interviews and focus group discussion to underpin the descriptive tables of the questionnaire. This combination will analyse the diversity among the potato farmers according the dimensions of EO and MO. First the group characteristics are explained and secondly the identification of the population according the seven dimension of EO and MO.

4.1 Farm survey - Respondent characteristics

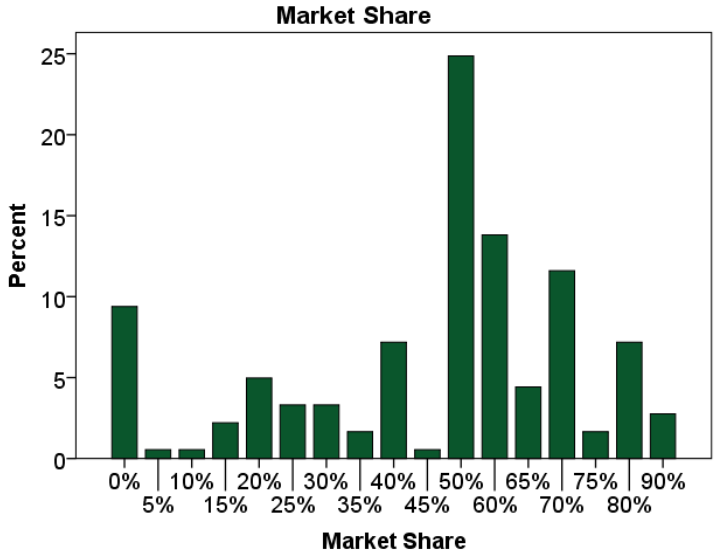
Table 4.1 shows the characteristics of the respondents. The characteristics will be further analysed as independent variables for the regression in the next chapter. The complete table is displayed in the Annex A.2. All respondents have in common that they grow potatoes and participate in FFS. Firstly the personal characteristics are displayed and secondly the resource endowments. The respondents are on average between 36 and 40 years old, married, literate and finished primary school. The farmers have on average between 0.6 and 1 hectares productive land, rotate 3 to 4 crops, have between 16-20 years of farming experience of which 2 years FFS experience. These respondent characteristics are necessary to analyse whether it influence the EO and MO or not.

Table 4.1 Respondent characteristics

Variables	Scales	Percentage N(%)	Mean	Mode	SD
Gender	Male	100 (54.9)	0.45	0	0.499
	Female	82 (45.1)			
Age	15-20	6 (3.3)	5.29	4	2.067
	21-25	3(1.6)			
	26-30	27(14.8)			
	31-35	36 (19.8)			
	36-40	35 (19.2)			
	41-45	21 (11.5)			
	46-50	22 (12.1)			
	51-55	19 (10.4)			
	56-60	7 (3.8)			
	61-65	5 (2.7)			
Marital status	Single	10 (5.5)	2.10	2	0.596
	Married	158 (86.8)			
	Widowed	14 (7.7			
Literacy level	No	31 (17.0)	0.83	1	0.377
	Yes	151 (83.0)			
Formal education level	Never	28 (16.4)	1.98	2	0.820
	Primary	130 (71.4			
	Secundary	24 (13.2)			
Total size of production fields	0.1-0.5 ha	78 (42.9)	2.20	1	1.503
	0.6 – 1ha	43 (23.6)			
	1.1 -1.5 ha	36 (19.8)			
	1.6 -2.0 ha	3(1.6)			
	2.1 – 2.5 ha	12(6.6)			
	3.1 – 3.5ha	7 (3.8)			
Total number of crops	1	3 (1.6)	3.68	4	1.369
	2	40 (22.0)			
	3	41 (22.5)			
	4	50 (27.5)			
	5	28 (15.4)			
	6	17 (9.3)			
	7	2 (1.1)			

	8	1 (0.5)			
FFS experience	>1	17 (9.3)	2.23	1	1.076
	1	64 (35.2)			
	2	29 (15.9)			
	3	60 (33.0)			
	4	7 (3.8)			
	5	4 (2.2)			
Farming experience	1-5 years	67 (36.8)	2.40	1	1.548
	6-10	49 (26.9)			
	11-15	26 (14.3)			
	16-20	23 (12.6)			
	21-25	3 (1.6)			
	26-30	11 (6.0)			
	31-35	3 (1.6)			
Cow	0	84 (64.2)	0.77	0	0.911
	1	67 (36.8)			
	2	23 (12.6)			
	3	7 (3.8)			
	6	1 (0.5)			

In Rwanda, the government promotes to rotate the potatoes with other crops. The farmers rotate the Irish potatoes with beans (95,1 percent), maize (90,7 percent), wheat (35,2 percent), local vegetables (32,9 percent) and sweet potatoes (26,0 percent). A detailed table of this can be found in the Annex A. Cruza (around 30 percent of the respondents) Kinigi (around 10 percent of the respondents) and Peko (around 10 percent of the respondents) are the main potato varieties (of the 19 varieties in total) produced by the respondents. The main argument for producing Cruza is their resistance to diseases and viruses and harvest security. Noteworthy to mention is that producers simply like this variety for household consumption. Although Kinigi is seen as a cash crop, Cruza is seen as a more subsistence crop because of their low market-value and market acceptance (Goossens, 2002). The size of the production field is less than a hectare for 67 percent of the respondents. Despite the farmers generally produce Cruza, a strong focus can be seen in the Graph 4.1 towards market production. Already can be stated that the market varieties Kinigi, Sangema and Victoria are not only used to sell at the market but the common variety Cruza as well, although Cruza is not a market oriented variety.



Graph 4.1 The share of the harvest to the market in percentages

The next sub-sections describe the second research question “What is the diversity in entrepreneurial- and market orientation in the Rwandan potato sector based on the dimensions of entrepreneurial orientation and market orientation?” by using the insights from the farm survey, the focus groups and the farmer interviews. The tables in this chapter will describe the current state of entrepreneurial attitude based on the seven dimensions.

4.2 Learning orientation

Learning orientation determines the ability of entrepreneurs to make successful decisions from experience and developing knowledge. Table 4.2 shows a positive attitude towards learning by doing (Q58, Q62), 77.4 percent of respondents claim to be eager to test improvements of new production possibilities ‘often’ to ‘always’. 81.3 Percent of farmers are also interested to learn from other farmers. Furthermore, Q107 shows that 74.7 percent of the farmers are working closely together in FFS to improve their business. Probably they work closely together because a task of the facilitator is to create cohesion in the FFS group. Quotes 1 and 2 confirm that farmers are eager to learn from the FFS facilitator and the positive effects that farmers have experienced through FFS involvement. Nevertheless, 69.2 percent of the same farmers almost never ask their buyers whether they are satisfied about the potatoes. This seems to suggest that learning orientation is mainly focused on the production side and less on the market side.

Quote 1 Anastase Kayobotsi, Musanze

Before I didn’t know how to improve my production. 5 Years ago my production was still low, but nowadays it is increasing. Nowadays I increase my production field but also reduce the seed, because I have learned how to cultivate on rows with spacing. I also learned how to make farmyard manure from my own livestock. Anastase KAYOBOTSI, 42 years, Musanze district, Bihinga, 5 children. Annex E.4

Quote 2 Innocent Kamondo

From FFS I have learned how to improve my production, by selecting good seeds and use the right fertilizers, chemicals and pesticides. Today my production increased, I will buy more livestock to have more manure for the fields. Innocent KAMONDO, 59 years, 12 children, Nyamagabe District, village Muhumo. Annex E.8

Table 4.2: Learning orientation

Q	**Variable**	**Never N(%)**	**Sometimes**	**Often**	**Always**	**Mode**
58	When an extension officer/facilitator explains how I can improve my production I am eager to test it	*12 (6.6)*	*29 (15.9)*	*112* (61.5)	*29 (15.9)*	3
62	I go to other farmers to see how they produce differently than me	29 (15.9)	5 (2,7)	77 (42.3)	71 (39.0)	3
72	I ask my buyers whether they are satisfied about the potatoes I sell to them	126 (69.2)	14 (7.7)	35 (19.2)	7 (3.8)	1
107	I work together with people who can help me improving my business	11 (6.0)	35 (19.2)	109 (59.9)	27 14.8)	3

4.3 Achievement orientation

Entrepreneurs take responsibility for their performance and are eager for feedback, reflect and set challenging goals to constantly improve themselves. this is clearly shown in Quote 3.

Quote 3 Jean Pierre de Dieu

In about 2 or 3 years I would like to have increased my production and I would like to become an important farmer. I want to look for other trainings and field visits to learn more. Increasing my cattle and land would really help me to further develop myself. What I can see now is that my farmland is increasing all the time because I try to buy new land when I have saved enough money. Jean Pierre de Dieu, 45 years, Rubavu district, married, 5 children.

Table 4.3 shows that respondents are achievement oriented. From question Q83 in Table 4.3 we see that 81.3 percent of the respondents know their costs of production. Farmers show their eagerness to save money in order to prevent spending money on new seed (Quote 4). Because of the program of FFS they learn how to do their administration. From question Q84 we see that 91.8 percent of the respondents often to always try to increase their production. Since last year 53.8 percent of the farmers actually increased their yield. Overall data of BTC support this claim as total production increased by 50 percent because of the FFS program. From focus group discussions and interviews we understand that farmers are eager to expand their production field. From the questionnaire Q86 we see that 77.5 percent of the farmers do have this strategy. Following this positive strategy with a focus on production increase, knowing costs and production increase Q87 also shows that 89.6 percent of the farmers experience an increase in income.

Quote 4 FFS group Abatiganda

When the potatoes are fully grown we save seed for our own production. To avoid spending money in buying seeds. The best seeds are taken to those potatoes which are fully grown. FFS Group Abatiganda, Gicumbi district, 27 members

Table 4.3: Strategy

	Strategy	Totally disagree	Disagree	Agree	Totally agree	Mode
83	I know the costs of my production	16 (8.8)	18 (9.9)	54 (29.7)	94 (51.6)	4
84	I try to increase my production per are	5 (2.7)	10 (5.5)	72 (39.6)	95 (52.2)	4
85	My yield increased since last year	70 (38.5)	14 (7.7)	83 (45.6)	15 (8.2)	3
86	I try to increase my field for production of irish potatoes	27 (14.8)	14 (7.7)	70 (38.5)	71 (39.0)	4
87	My income increases every year	4 (2.2)	15 (8.2)	79 (43.4)	84 (46.2)	4

4.4 Autonomy orientation

Contract farming is a popular method to improve wealth of the farmer in sub Saharan African countries. Although this is frequently used, potato farmers in Rwanda are not familiar with this concept. Because they are not familiar with this concept, from Table 4.4 we see a negative response on questions Q88, Q89 and Q90. even though the farmers do not work with contracts they show loyalty to their buyers. Also they show loyalty to their leader of the farmer group like for example the FFS group TUZAMURANE (quote 5). From Table 4.5 we see that 70.3 percent of the farmers prefer to work in a group and 92.3 percent only with their own FFS group. TUZAMURANE relates this finding to communication in quote 6. From Quote 7 and 8 of the FFS group Abatiganda we learn that working together in a group is also good to reduce costs and develop new innovations in order to reduce costs.

From Question 100 in Table 4.6 we see that 74.7 percent of the farmers do not make use of loans. From the focus groups and interviews we see several arguments. First, we see that farmers need to be officially a member of a cooperative. secondly, farmers face difficulties to approach financial institutions due to their production level. Thirdly, due to a lack of assets it is difficult to attract loans. Fourth, according to quote 9 and to other farmers loans are too expensive. Fifth, due to limited

harvests, the risk is too high to apply for loans. Although many difficulties exist, from question 104 we can conclude that 71.5 percent of the farmers is interested to go to financial institutions for a loan. However, a large share of these farmers do not have enough financial guarantee to take loans Annex B.4.

Quote 5 **FFS group TUZAMURANE**

In our association, in the time to choose a leader we have an election, but especially we choose (Julius) because he is a native in our region. He comes from a region where they grow many potatoes. Julius is trained to grow potatoes, and has more potential compared to the rest of the group. That is why we choose him already several times as the leader of the group. TUZAMURANE, District Burera, 20 members. Annex E.10

Quote 6 **FFS group TUZAMURANE**

To work together is good but when the number of people becomes too large, the communication becomes complicated and some people refuse to work with others because they think that other members are free-riding on the work of others that is why we decide to remain with our own group of 20 members for making communication easy. TUZAMURANE, District Burera, 20 members. Annex E.10

Quote 7 **FFS group Abatiganda**

As a group we sit together and make decisions. To reduce costs we decide to do some activities ourselves. We bring manure from our house in terms of avoiding to send money in buying manure, and for climbing beans, the sticks beans climb on we bring it ourselves for avoiding to buy those sticks. Abatiganda, District Gicumbi, 27 members.

Quote 8 **FFS group Kundumurino**

“Sometimes when we have many potatoes that can fill a truck, we take potatoes ourselves to Kigali market. At the time the truck is not full, we buy from other farmers, until a truck is full and take it to the Kigali market. One group member coordinates the distribution and we act as a collective” FFS group: Kundumurino, Burera. Annex E.11

Table 4.4: Farming on contract

	Contract	Totally disagree	Disagree	Agree	Totally agree	Mode
88	Did you ever sign a contract with a buyer	176 (96.7)	2 (1.1)	4 (2.2)	0 (0.0)	1
89	Did you ever sold your potatoes before harvesting	161 (88.5)	3 (1.6)	7 (3.8)	11 (6.0)	1
90	Would you be interested to sign contract to sell while they are still in the field	168 (92.3)	5 (2.7)	7 (3.8)	2 (1.1)	1
91	If yes, would you still sell the potatoes to someone else when they offer a better price?	2 (1.1)	178 (97.8)	1 (0.5)	1 (0.5)	2

Table 4.5: Groupwork

		Group	Individual	mode
60	IF YES: 60. would you do it as a group or individual	128 (70.3)	54 (29.7)	1
		Own FFS	**Together**	
61	IF AS GROUP: Would you prefer to work with YOUR FFS group only or make a larger group of several FFS groups together?	152 (92.3)	11 (7.7)	1

Quote 9 FFS group Rubavu

interest rates on loans are very high; the process of asking loans take a long time, and sometimes this causes a bigger loss than calculated, because you can ask loans in the preseason and the bank gives that loan in the out season. FFS group Rubavu, 17 members. Annex E.14

Table 4.6: Access to finance

	Access to finance	*No*	*yes*	*Never visit institutions*	*Through association*	
100	I took a loan for production	136 (74.7)	46 (25.3)	-	-	
103	I go to financial institutions myself	134 (73.6)	41 (22.5)	1 (0.5)	6 (3.3)	
		Totally disagree	**Disagree**	**Agree**	**Totally agree**	**Don't know**
104	I would be interested to go to a financial institutions for credit	24 (13.2)	24 (13.2)	82 (45.1)	48 (26.4)	4 (2.2)

20.8 Percent of the farmers attract their loans from local financial institutions like SACCO and BPR (Table 4.7, question Q105). We also see that a saving culture exists. Associations and cooperatives have their own saving accounts which they use for investments like investing in mobile phones for the members (focus group, 13nd June 2013, Burera, Rugarama with group TUZAMURANE), cattle (Quote 10) and sometimes agricultural unrelated assets like mattresses for the family (Quote 11).

Quote 10 - FGD 1 – FFS KUNDUMURIMO group

We meet once in a week, every Monday and we try to bring at least 100 frw as a contribution. With this saving system we bought domestic animals for all members of the group. FFS group KUNDUMURIMO, 22 members with 6 female and 14 male, Burera. Annex E.11

Quote 11 - FGD 2 – FFS DUHINDURE IMIKORERE group

In the first season we harvested around 1.7 tons, we started to develop ourselves in that way and we started to do some actions between us. We bought mattress for each member, those mattresses each cost 18000frw. FFS group DUHINDURE IMIKORERE, 15 members, Gicumbi, Annex E.13

Table 4.7: Access to loan

		No loan	Local Bank	BPR	CSS	Own capital	Association	Cooperative	SACCO
105	I get a loan from	135 (74.2)	21 (11.5)	2 (1.1)	1 (0.5)	1 (0.5)	6 (3.3)	1 (0.5)	15 (8.2)

4.5 Market orientation

Market orientation is strongly correlated with competitive aggressiveness.

Table 4.9 shows 31 percent of the farmers sell their potatoes at their field and almost all farmers sell their potatoes at the farm gate because buyers go to their homes to collect the potatoes on foot, bike or truck. The other part of the farmers sell their potatoes to transporters and traders at their field (Table 4.8: Market access

Table 4.9). Question Q98 Annex A.8 shows that a large part of the farmers go to the markets themselves however this is less beneficial (Q99). The cross table in Annex A.8 show that farmers who sell their potatoes at the field also go to the market themselves. This is contradicting because expected from the question asked is that these farmers do not leave their farm gate. 80.7 Percent of the respondents sell their harvest at their farm gate because this is more beneficial or they do not have enough harvest to go to the markets themselves (Q99 and quote 12). The percentages are unclear

because transport by bike can be another transporter. This explains again that farmers perceive to sell their crops at the farm gate.

Quote 12: FFS group ABATIGANDA

we work for our village market only. Because we have a low harvest we can't sell to other markets. We also can't call a truck together because the production is still too low. Markets like GICUMBI market or KIGALI markets are too far for us to go. FFS group ABATIGANDA, Gicumbi district, 27 members.

Table 4.8: Market access

		Never	Sometimes	Often	Always	Mode
98	I go to the nearest market myself	55 (30.2)	31 (17.0)	27 (14.8)	68 (37.4)	4
99	Selling at the farm gate is more beneficial than selling at the market	22 (12.1)	13 (7.1)	66 (36.3)	81 (44.5)	4

Table 4.9: Market channels

Market channel	Number 1st channel	Number 2nd channel	1st + 2nd market	Percentage of total population
Trader	7	2	9	3.77
Transporter	45	5	50	20.92
Market	56	7	63	26.36
On the field	44	30	74	30.96
Restaurant	5	4	9	3.77
Transport by bike	5	8	13	5.44
Transport by head	12	3	15	6.28
For other Families	5	1	6	2.51
Total	179	60	239	3.77

Q73 And Q74 in Table 4.10 and state that farmers do not know the prices of the potatoes to the next buyer. 23 percent of the farmers ask their buyers whether they are satisfied about the potatoes. 11.5 percent know the costs of transporting the potatoes to Kigali. From interviews we can also understand that farmers do not exactly know prices (Quote 13). Although farmers do not exactly know prices along the value chain, 36.2 percent do have access to buyers (Q76) to contact them when necessary. Although we see an increase of mobile phones among the farmers, 9.4 percent do not contact other potential buyers (Q77 and Quote 14).

Farmers do not inform themselves about prices and product satisfaction, 53.3 percent (Q79) of the farmers try to understand what the buyers want in the next season and also 47 percent of the respondents know what other buyers want (Q80). Most of the farmers know that Kinigi is a better variety to sell at the market than Cruza, but because of risks they choose to continue producing Cruza. Some farmers first need to develop economies of scale before they can enhance a more market approach (Quote 15). Although most of the respondents don't know at what price the trader sell their potatoes to the next buyer, from question 81, 42.3 percent of the farmer know where traders sell their potatoes. 51.1 percent of the farmers check whether it is better to sell their potatoes to another buyer than their current buyer (Q82).

Quote 13 Farmer profile Emmanual Kanimba

"I do not have any contact persons for selling my production. The biggest part of the harvest I use for seeds, and the other part I sell on the field to other buyers. Sometimes I also collect all the potatoes to transport the production to Kigali. " Emmanual Kanimba – 32 years – 2 children – 1 ha - Rubavu – Nyakabungo village. Annex E.7

Quote 14 Farmer profile from farmer in Musanze

> *"When I start selling my potatoes I call people to come and pick it up. I can also go to the market myself. We find markets in the sector KINIGI and the city MUSANZE. I sell my potatoes 4 months after harvesting and other crops in general around 8 months after harvesting. I can call people or I can send a child that will explore the market to tell the market about my potatoes. The prices we receive are different to different markets. The Kinigi market price is not high like the market of Musanze. But in the season the prices are changed and we don't see a big difference at the moment."* Man – 33 years – 4 children – 80 are – Musanze. Annex E.3

Quote 15 Farmer profile Jean Pierre Nkiranuye

> *"I can't further improve my marketing because I have not the budget for this. In order to further market my potatoes I firstly need to increase my production. But for this I don't have enough land."* Jean Pierre Nkiranuye – 2 children – 30 are – Gicumbi. Annex E.2

Table 4.10: Market orientation

	Market orientation	Totally disagree	Disagree	Agree	Totally agree	Mode
72	I ask my buyers whether they are satisfied about the potatoes I sell to them	126 (69.2)	14 (7.7)	35 (19.2)	7 (3.8)	1
73	I am aware at what price my trader sell the potatoes to the next buyer	110 (60.4)	21 (11.5)	23 (12.6)	28 (15.4)	1
74	I am aware at what price the potatoes are sold to the final buyer	154 (84.6)	4 (2.2)	13 (7.1)	11 (6.0)	1
75	I know the costs of transporting the potatoes from here to Kigali	159 (87.4)	2 (1.1)	5 (2.7)	16 (8.8)	1
76	When I want to contact my buyer, I can contact him or her by phone now	90 (49.5)	26 (14.3)	39 (21.4)	27 (14.8)	1
77	I also have phone contact numbers of others potential buyers	161 (89.0)	3 (1.7)	9 (5.0)	8 (4.4)	1
78	I first focus on my household consumption and after on the market	61 (33.7)	17 (9.4)	72 (39.8)	30 (16.6)	3
79	I try to find out what my buyers want to buy from me in the next season	58 (31.9)	27 (14.8)	69 (37.9)	28 (15.4)	3
80	I know what other buyers than my current buyers want	73 (40.3)	22 (12.2)	68 (37.6)	17 (9.4)	1
81	I know where my traders sell the potatoes	69 (37.9)	36 (19.8)	43 (23.6)	34 (18.7)	1
82	I check whether it's better to sell my products to another buyer than my current buyer	34 (18.7)	55 (30.2)	62 (34.1)	31 (17.0)	3

4.6 Innovative orientation

Innovative orientation determines the openness of entrepreneurs for new developments within their area of production and market opportunities. This part is mainly focussed on production opportunities, the development of market opportunities was discussed in section 4.5. To determine the attitude towards innovation of farmers, the research is partly focused on implementing new varieties and techniques. During interviews and focus group discussions the farmers continually addressed the necessity of better varieties and techniques, especially to increase the harvest and reduce the risk of viruses and diseases. Varieties like Kinigi are exhausted due to lack of rotation and multiple use of seeds. Hence, the variety Cruza is abundant and mainly used for home-consumption or sold at local

markets and not attractive for the commercial market. The outcomes of Table 4.11 are surprising. Although we see that 84.1 percent of the farmers are willing to test new varieties (Q57), overall we can see that 59.2 percent of the farmers do not trust that the quality-seed is good. The moment that quality seed (

Table 4.12) will reduce risks like diseases and viruses, 57.7 percent of the farmers are willing to invest in quality seed (Q94). Nevertheless in Table 4.13 is shown that 58.8 percent of the farmers do use their own produced seed. Apart from literature we understand from development agencies like the BTC, KIT and the ministry of agriculture of Rwanda that access to quality seed and certified seed is poor. Because the supply is limited and the production of seed quality is low due to bad techniques, storage and bad management. The respondents from the focus group discussions and interviews do innovate their production techniques and develop their knowledge. An outcome of this we see from quote 16 of a FFS Group in Rubavu. All farmers still face mainly problems with bad weather conditions and its effect on the riskiness of quality seeds. That’s why they stick to their Cruza variety because this variety is best protected against hazards.

Quote 16 FFS group Rubavu

> *In our group it is not allowed to grow the same crop in a successful season; Rotating increases our production; rotations helps us to decrease diseases of crops because the disease of the potatoes is different to disease of the beans or others crops.* FFS group, Rubavu, 17 members. Annex E.14

Table 4.11: Innovativeness

Q	Innovativeness	*Totally disagree*	*Disagree*	Agree	Totally agree	Mode
57	When there is a new variety that can possibly increase my harvest I test it	*26* (14.3)	*3* (1.6)	*78* (42.9)	*75* (41.2)	3
58	When an extension officer/facilitator explain me how I can improve my production I am eager to test it	*12 (6.6)*	*29 (15.9)*	*112* (61.5)	*29 (15.9)*	3
59	If I know that I can get a higher price when I wash or package my potatoes I will wash or package the potatoes	*1 (0.5)*	3 (1.6)	83 (45.6)	95 (52.2)	4
62	I go to other farmers to see how they produce differently than me	29 (15.9)	5 (2,7)	77 (42.3)	71 (39.0)	3

Table 4.12: Seed quality

		Totally disagree	*Disagree*	Agree	Totally agree	Mode
92	I trust that the Irish potato seed bought has a good quality	44 (24.6)	62 (34.6)	65 (36.3)	7 (3.8)	3
94	I would pay more for my seed of the same variety when I am sure this seed has no disease and has a better germination rate	56 (30.8)	17 (9.3)	44 (24.2)	61 (33.5)	4
95	I prefer certified seeds more than local seeds. (farmer saved seed = no certification)	8 (1.1)	0 (0)	70 (38.5)	102 (56.0)	4

The concept of FFS involve a test field. This test field is used for testing new varieties, the seed on this field is donated for FFS purposes and thus explains the willingness to try and test new varieties and activities. The facilitator is key to development of the farmers that participate in FFS. The facilitator stimulates and trains the farmers on the test fields to do basic innovations like using improved fertilizers or stimulate to innovate in processing manure from livestock, so the manure can be sold at the market for other farmers. The facilitator also evaluate the crops and the condition of the field

together with the farmer of the field. Because the farmer learns how to select the best seeds, from Table 4.13 we see farmers get their new seed from their own selection (Quote 4) or surrounding farmers and other FFS members (Quote 17 and 18). Some experienced farmers can afford to buy the best (relatively costly) quality seeds from RAB.

Table 4.12 indicate that 41 percent of the farmers trust that the quality of the seed (Q92) is good. 57.7 percent is willing to invest in improved varieties and 94.2 percent of the farmers prefer certified seeds above local seed.

Table 4.13: Access to seed

		None	RAB	Own selection	Traders	Other farmers	Own cooperative
93	From whom do you buy seeds	-	10 (5.5)	107 (58.8)	47 (25.8)	17 (9.3)	1(0.5)
93	Second option to 93	112 (61.5)	2 (1.1)	7 (3.8)	33 (18.1)	28 (15.4)	0

* N (%)

Quote 17: Farmer profile: lady from Gicumbi

"I increased my production because I know how to use modern production techniques. I learned how to sow seed because I worked in a Cooperative called KUNDISUKA and I am part of the FFS group, from here I gained skills." (Small farmer - Female - 26 years - Gicumbi district). Annex E.1

Qoute 18: Farmer profile: Emmanual Kanimba

"My farm activities are increased when I compare this with today and before. I increased the Irish potato production. In the previous days I harvest between 500kg and today between 1.000 and 3.000 kg per harvest. (0,5 ha permanent, 0,5ha temporary). On 1 are I harvest between 100-200 kg nowadays. Since I started to participate in FFS I see a tremendous increase in production". (Emmanual Kanimba – Male - 32 years – 1 ha – Rubavu district. Annex E.7

4.7 Risk-taking and personal initiative

Besides innovation, entrepreneurship includes taking risks. What we see from the literature is that farmers in developing countries are risk averse. The level of entrepreneurship of these farmers can be partly found in the dimension of risk taking that is displayed in Table 4.14. 62.6 Percent of the farmers are willing to invest in quality seed which is good for innovative purposes, farmers are willing to take risks taking into account that quality seed is most often costly. From interviews with stakeholders that work for development institutions they conclude that farmers are often not willing to wait to harvest until the potatoes are mature, because of common diseases and viruses and the necessity to have money for their household. From the questionnaire (Q64) we see that 90.2 percent of farmers often to always harvest their potatoes at maturity. A common heard problem that farmers harvest their potatoes at the time the prices are high, is not supported by the data. A small number of farmers have good storage possibilities and they can store potatoes to wait for better prices (quote 19), but mostly for seed potato to use it for the next season. The interviews showed that quality storage is difficult, the potatoes attract viruses and diseases and it is hard to store for a long time.

Personal initiative, Table 4.15, is another dimension of EO and according to some authors the key to development that distinguishes regular farmers from entrepreneurial farmers. 79,1 percent of farmers are willing to be the first to start new activities (Q67), although 71.9 percent of the respondents see difficulties along this route (Q68). Working in groups is necessary to create better accessibility in all forms. 70,3 percent prefer to work in group as it can increase their income (98.4 percent). Although some farmers like to

take the lead in harvest activities, most of them do not prefer to personally take responsibility for organising a group (69.2 percent). Every FFS group has their own group leader selected through elections. Overall I have observed two main reasons to make a decision, (1) the economic most successful person, (2) the best skilled and knowledged participant. Although the leader is present, sometimes the wealthiest farmer takes business related decisions like to transport the harvest to the market.

Qoute 19 Farmer Rubavu

I store my harvest in the time the region faces over-production. During this period, prices immediately decrease, this means that I try to wait till the prices rise due to less supply. Especially my potatoes I store them because my purpose is to produce seeds. Besides this I try to store potatoes to gain better prices. Farmer Rubavu, 5 hectares, 45 years, 5 children. Annex E.7

Table 4.14: Risk-taking

	Risk taking	*Totally disagree*	*Disagree*	Agree	Totally agree	Mode
63	I spend more money on quality seeds when this improves my production	49 (26.9)	19 (10.4)	55(30.2)	59 (32.4)	4
64	I only harvest my potatoes when the potatoes are fully grown.	5 (2.7)	11 (6.0)	45 (24.7)	121 (66.5)	4
65	When the prices are high, I harvest my potatoes as soon as possible	167 (92.3)	9 (5.0)	3 (1.7)	0	1
66	If it is possible to gain a higher price later, I would try to store my potatoes	88 (48.6)	21 (11.6)	56(30.9)	16 (8.8)	1

Table 4.15: Personal initiative

	Personal initiative	Totally disagree	Disagree	Agree	Totally agree	Mode
67	I am willing to start new activities that other farms do not do, yet	20 (11)	18(9.9)	89 (48.9)	55 (30.2)	3
68	It is easy to start new activities that other farms do not do, yet	92 (50.5)	39 (21.4)	39 (21.4)	12 (6.6)	1
69	If it can increase my income by working in groups, I would make an effort to work together with other farmers to sell my potatoes,	3 (1.6)	0 (0.0)	59 (32.4)	120 (65.5)	4
70	I like to take the lead with such harvest activities	22 (12.1)	24 (13.2)	66 (36.3)	70 (38.5)	4
71	I personally like to take the lead to organise the group to be able to sell together as a group.	111 (61.0)	15(8.2)	27 (14.8)	27 (14.8)	1

4.8 Conclusion

This chapter described the dimensions. Firstly the determinants are described to show the diversity among the respondent group. Secondly the dimensions are described individually. The learning orientation show that farmers are willing to learn from their facilitator by working closely together with their FFS group. Farmers are achievement oriented by setting challenging goals and realise development since they join FFS. The farmers are less autonomy oriented but some respondents have leadership roles. They are loyal to their FFS leaders and have strong group commitment. Groupmembers often have their group saving account. The farmers are less market orientated compared to the other dimension. A large part of the farmers do not inform themselves and sell their potatoes from their fields. The respondents show some innovative activities, but this innovations mainly focus on small production improvements that is taught by FFS. Although farmers in developing countries are reluctant to take risks they wait to harvest until the potatoes are fully grown. Storing for a long time cause high risks for the general farmer because the potatoes easily get infected with

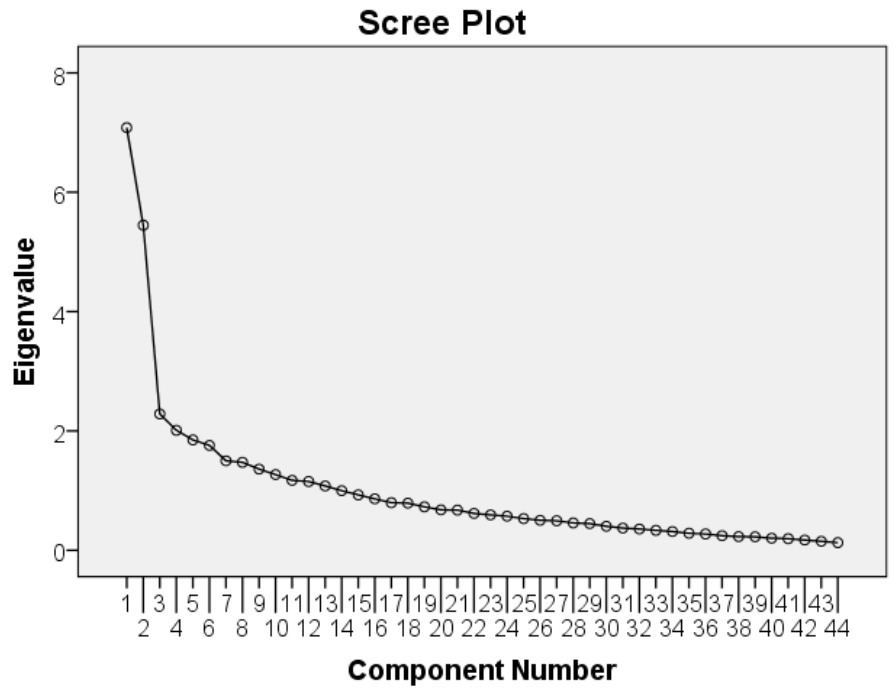
diseases or viruses due to insufficient stores. sometimes farmers decide to sell a part directly after harvesting the potatoes to prevent huge losses. The personal initiative is also on a good level however mostly the leader decide what actions should be taken, farmers also decide as a group with respect to the leader.

5. Quantitative results - Entrepreneurial orientation and market orientation

The quantitative analysis is used to indicate the diversity among the farmers according the factor MO and EO. Firstly the factor analysis is explained and secondly the linear regression on the factor MO and EO is shown. The factor analysis is done to decrease the number of 53 questions to two analysable variables that indicate an EO or MO factor to execute the linear regression. The linear regression tests the diversity according the determinants that explains the MO and EO of potato farmers in Rwanda.

5.1 Components of EO and MO – a factor analysis

From the 87 questions in the farm survey questionnaire, 53 questions are about entrepreneurial and market orientation and the other 34 about the resource endowments and the characteristics of the farmers. A factor analysis is conducted on the 53 responses related to EO and MO in order to reduce the number of variables and to investigate the relationship between the variables that form a component of EO and MO.



Graph 5.1: Screeplot factor analysis

First, a Kaiser-Meyer-Olkin and the BTS test confirm that the sample size is adequate for the factor analysis. Graph 5.1 presents the screeplot which shows that we have two clear coherent components: EO and MO. Annex B.1 presents the rotated component matrix which gives us the factor loadings for each variable on each component.

While some scholars argue that the EO and MO are interrelated (Naldi et al., 2007), Lumpkin and Dess believe that two orientations can exist independently from each other. Entrepreneurs in developing countries have different starting points concerning resource endowments and motivations to make decisions. Therefore, some dimensions could be less relevant than others. In line with the definition, EO includes a number of separable dimensions. MO, on the other hand, is a clear component of which all the variables that are included in the component are related to market orientation.

Table 5.1: Rotated component matrix for factor analysis

VAR	Question	EO*b*	MO
QA84	I try to increase my production per are (A*c*)	0.787	
QA108	I have good access to input (A)	0.756	
QA59	If I know that I can get a higher price when I wash or package my potatoes I will wash or package* the potatoes (I)	0.785	
QA70	I like to take the lead with such harvest activities (P)	0.753	
QA87	My income increase every year (A)	0.648	
QA83	I know the costs of my production (A)	0.571	
QA95	I prefer certified seeds more than local seeds (I)	0.592	
QA64	Í only harvest my potatoes when the potatoes are fully grown (R)	0.520	
QA98	I go to the nearest market myself (M)	-0.566	
QA71	I personally like to take the lead to organize the group to be able to sell together as a group. This also includes making the contact of contract with the trader/transporter (P)	0.617	
QA85	My yield increased since last year (A)	-0.551	
QA69	If it can increase my income by working in group, I would make an effort to work together with other farmers to sell my potatoes (P)	0.499	
QA75	I know the costs of transporting from here to Kigali (M)		0.814
QA74	I am aware at what price the potatoes are sold to the final buyer (M)		0.775
QA77	I also have phone contact numbers of other potential buyers (M)		0.786
QA72	I ask my buyers whether they are satisfied about the potatoes I sell to them (M)		0.590
QA76	When I want to contact my buyer, I can contact him or her by phone (M)		0.649
QA79	I try to find out what my buyers want to buy from me in the next season (M)		0.490
QA66	If it is possible to gain a higher price later, I would try to store my potatoes (R)		0.412
QA81	I know where my traders sell the potatoes (M)		0.438
QA73	I am aware at what price my trader sell the potatoes to the next buyer (M)		0.466
QA80	I know what other buyers buyers than my current buyers want (M)		0.496

a: KMO:0.759* - ***b: EO: Entrepreneurial Orientation* α=0.728– *MO: Market orientation* α=0.864**
c: I: Innovative orientation – R: Risk-taking – P: Personal initiative – M: Market orientation – A: Achievement orientation

5.2 The determinants of EO and MO

This section will analyse the determinants of farmers' MO and EO. The dependent variables for this regression are the components of MO and EO derived from the factor analysis in the previous section. The determinants include variables related to individual characteristics, household level characteristics, assets, experience of the farmer, product related variables and region. Table 4.1 provides summary statistics of the independent variables.

The correlation table that can be found in Annex B.3 shows that some of the independent variables are highly correlated. For example, number of *children* is correlated with *age* (.626***) and *farming experience* (.425***) and therefore *children* is excluded as an independent variable. The results of the linear regression is displayed in Table 5.2.

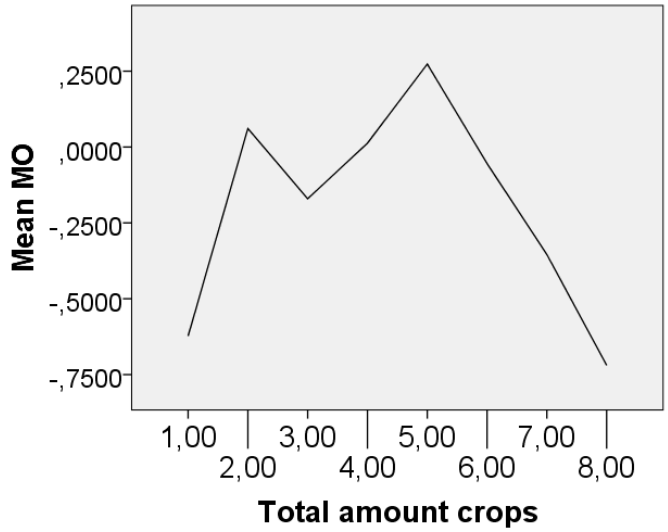
Table 5.2: Linear regression analysis MO and EO

Dependent variable	**MO**		**EO**	
N	168		168	
F	3.622***		4.122***	
Adj R^2	.398		.207	
Independent variables	B	Se	B	Se
(Constant)	-1.036***	.359	.100	.412
Age	-.011	.033	-.055	.038
Gender	-.124	.137	-.371**	.155
Education level	.166**	.079	.217**	.089
FFS experience	.028	.049	.014	.056
Farming experience	.028	.046	-.013	.053
Total size of production field	.099**	.050	.025	.058
Livestock property	.070	.087	.109	.099
Number of crops	.117*	.062	-.084	.071
Distance to market	.094***	.027	.118***	.029
Market variety	.064	.143	-.433***	.160
EO	-.155**	.070	-	-
District Musanze*	.623***	.231	-.493*	.262
District Gicumbi	-.602***	.245	-.499*	.278
District Rubavu	-.702***	.191	-.322	.217
District Nyamagabe	-.994***	.250	-.255	.286
***District Burera is the reference district**				

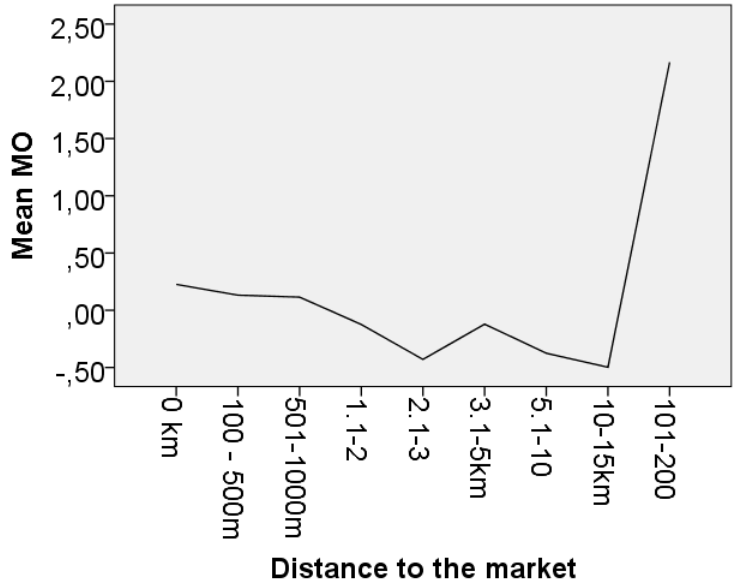
5.3 Market orientation

Starting with MO, eight variables significantly determine MO. Market oriented farmers seem to be better educated and have larger production fields. These results are in line with expectations. Furthermore, market orientation is also higher if farmers cultivate a larger number of crops. Although potatoes are the most profitable crop they produce, this result seems to suggest that more crops give more market possibilities. More crops may enable households to diversify between commercial crops for the market and subsistence crops for own consumption. Farmers confirm that it is important for their household to produce more crops for their nutritional value. Crops are also used for animal feed in order to produce milk and manure. This is supported by the correlation table in Annex B.3 as it shows a correlation coefficient of 40 percent between livestock and total number of crops. Graph 5.2, however, shows that the relationship between MO and number of crops may be quadratic – where MO is low for farms with a very small (<1) or a very large (>5) number of crops and MO is high for farms with a medium number of crops. To test this hypothesis, the regression was also run with the square of *number of crops* included. However, this did not lead to a significant coefficient.

Another result from Table 5.2 is that MO seems to increase with the distance to the market. This result is counterintuitive and requires further investigation. Graph 5.3 shows the relation between MO and the distance at which the respondents sell their potatoes. It is clear that the regression results are largely driven by the observations of farmers that deliver their potatoes to the farthest markets (>100km). Most of the time farmers live far away from the large markets. Therefore, the further they transport their potatoes to a market the better price they receive for their crops. This explains the relation between the focus of farmers on long distance markets and their level of market orientation. To understand these benefits, information and knowledge about markets is necessary and therefore a high level of market orientation is necessary. Noteworthy is that a correlation is expected with total land size. Because of the costs of transportation farmers can only choose for the high demanding markets in case of sufficient pay-off. This means the larger the harvest the more profitable to transport the potatoes to Kigali by own initiative. This was confirmed by the in-depth interviews which showed that farmers with more land are more likely to sell their potatoes in Kigali. However, based on the farm survey we found only a small positive correlation between land size and distance to the market.



Graph 5.2: The effect of number of crops on MO



Graph 5.3: Mean MO distance to the market

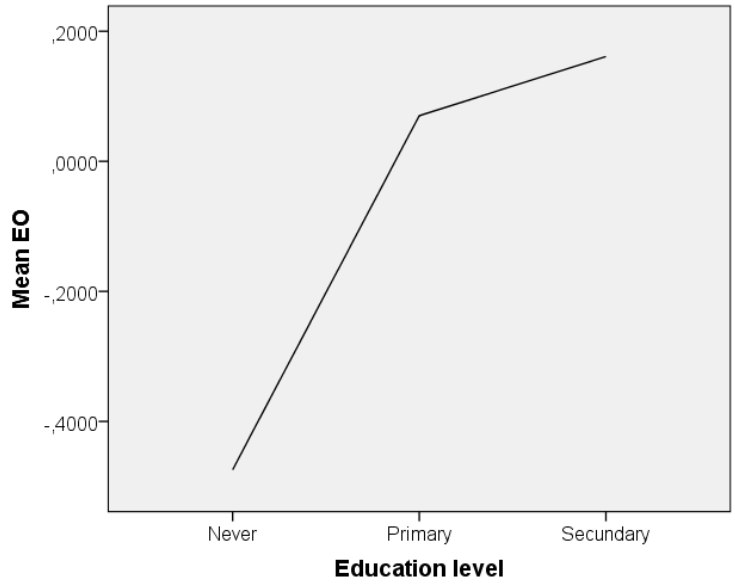
Other significant determinants are the districts. Due to the development in the district Musanze we expect the highest entrepreneurial as well market orientation in this region. Musanze is known for its potato production with the known variety Kinigi from the sector Kinigi. An important potato cooperation IMBARAGA is established and the governmental institution RAB is based in Musanze to develop the potato sector. This institution is based in Musanze because Musanze is known by its large areas of fertile soils and three growing seasons per year. Rubavu and Gicumbi show a negative relation to MO compared to Burera, although these areas also have fertile soils. Due to the location of the farmers in Rubavu and Gicumbi and less activities from IMBARAGA they perform not as good compared to Musanze and Burera. The farmers in Rubavu and Gicumbi also explained their bad infrastructure to the main road. Some farmers can only access their fields on foot. From the interviews and focus groups we noted that especially Nyamagabe is focused on household consumption rather than commercial potato production.

Finally, EO was also added as an explanatory variable to the regression model of MO. This factor is added as an determinant to indicate whether EO influences the level of MO. The literature claims that

this relationship is likely to be positive (Merlo and Auh, 2009). Table 5.2 shows that this is not true. There is a negative significant relationship (B=-0.155**) meaning that farmers that are more entrepreneurially oriented have a lower level of MO. A negative effect has to do with the focus of EO. EO is focussed merely on production improvement and the possibilities to improve the business on the field while MO is focussed on improvement of the business outside the field. These different ways of orientation determine the negative relationship of explanatory variable EO with MO. More details about the analyses of MO can be found in Annex B.1 until Annex B.8

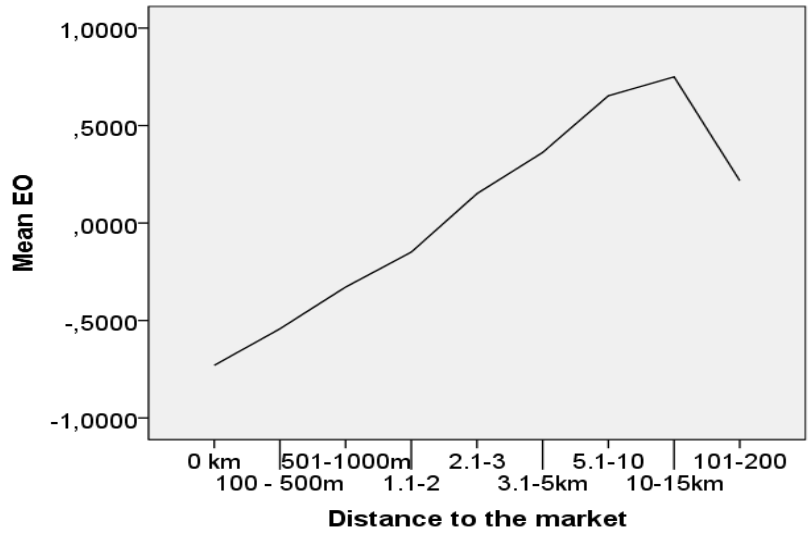
5.4 Entrepreneurial orientation

The results in Table 5.2 show that men are more entrepreneurially oriented than women. Because men are always the head of the family they also make decisions about the production process. Graph 5.4 confirms that the level of education positively influences the entrepreneurial orientation. Farmers that are better educated show more entrepreneurial attitude. The literacy level makes it possible to understand information and do record keeping. Distance to market positively affects entrepreneurial orientation. Graph 5.5 shows that there is a decline in EO for the largest distances from the market but in general there is a positive trend as EO increases with distance (Annex D.9). Farmers attract their information from elsewhere to improve their production and develop innovations and look for other opportunities. Farmers understand better how to use and buy better inputs like certified seed.



Graph 5.4: Education level within EO

A negative relation exists between the market variety and EO. This could be linked to the perceptions of farmers that these market varieties are more susceptible to diseases and are therefore more risky to adopt. EO is lower in district Musanze compared to the district Burera. Despite Musanze is known as the centre of potato production a higher EO is shown among the Burera respondents. However the explanatory variable FFS experience does not significant correlate to EO, it might influence the EO looking to districts. In total the largest group (50 percent) of the respondents in Burera joins FFS for three years however the largest group (77.8 percent) in Musanze participate only one year in FFS. Looking to the personal attitude and competences might this short participation be a reason for this difference. Thus this negative effect might exist because the farmers in Burera have professionalised very well in their production process. More details about the analyses of EO can be found in Annex D.1 until Annex D.10.



Graph 5.5: Distance to the market within EO

5.5 Conclusion

The factor analysis created two factors namely, EO and MO. EO consists of variables of all dimensions except from market oriented dimensions and MO consists of only variables that are related to market orientation. The factors are used to determine the relationship of explanatory-variables. Primary school educated farmers that have a large field to be able to have enough harvest to sell the potatoes at long distance markets, have a positive level of MO. These farmers also grow at least two other crops besides potatoes. EO negatively influences MO because EO is orientated on production on the field while MO is focussed on entrepreneurship outside the field. Furthermore we see that male farmers who received primary education and live at least 2.1 km away from their field and produce non-market varieties tend to be positively entrepreneurial oriented.

6. Discussion

This research looked at the entrepreneurial and market orientation of Rwandan potato farmers and the determinants that can affect their attitude. The research question and sub-questions are shown below. After the discussion on the outcomes of the research a recommendation for developing a Farmer Business School (FBS) is given.

Research question: *Which deficits in terms of entrepreneurial- and market orientation are detected and can be minimised through Farmers Business Schools for the potato farmers in Rwanda to further integrate them in the Irish Potato value chain.*

1) How are the concepts of entrepreneurial orientation and market orientation defined in a developing country context?
2) What is the diversity in entrepreneurial- and market orientation in the Rwandan potato sector based on the dimensions of entrepreneurial orientation and market orientation?
3) What explains the diversity in entrepreneurial orientation and market orientation of potato farmers in Rwanda?
4) What recommendations can be made for the development of FBS to improve the entrepreneurial competences of Rwandan potato farmers?

The first three sub-questions are discussed in the previous chapters. This provides the context of this research according to the literature and the case of FFS potato-farmers in Rwanda. This chapter is focussed on the insights and the results from this research, and how these insights can be useful for development of a FBS. I will first discuss the main findings from the previous chapters and I will conclude this chapter with recommendations for FBS development as an answer to sub-question 4.

6.1 Discussion of main findings

Main finding 1: “EO is on the right track of development but MO is not ‘yet’ on this same track”

The quantitative analysis of the seven dimensions of EO indicates an overall good level. According the factor analysis 50 percent of the farmers are entrepreneurial oriented and 30 percent are market oriented. From the interviews and focus group discussions, it became clear that the ambition among farmers to develop their skills and knowledge are strongly present. The eagerness to learn, innovate production processes and being pro-active is observed among a large group. Although the results indicate a good EO level, the farmers point out an entrepreneurial environment that suffers from difficulties related to low quality seed, erosion and climate change that strongly influence the production.

MO, however, is poorly developed according to the quantitative results. This was confirmed during the focus group discussions and interviews, because it was hard for the respondents to discuss the market and post-harvest possibilities. Therefore, more can be done on the level of MO. Once farmers have better market information they are better able to bargain, to monitor the markets, to understand differences in prices of their crops, inputs and innovation. Market oriented farmers should also better understand how to change their strategy in response to customer preferences and competitor strategies (Verhees et al., 2012). Although the urban markets offer better prices, respondents overall argue that markets are barely accessible due to the high costs of going there. The roads, for example, are poorly constructed and fields are only accessible on foot. The ‘rich picture’[3] assessment showed that farmers know where the Kigali market is but that they are not able to get there because they are dependent on many intermediaries like traders and transporters.

[3] ‘Rich pictures’ are displayed in the annex. This instrument is used to analyse the farmers’ perception of the value chain.

Main finding 2:”EO is determined by personal characteristics while MO is determined by resource endowments”

A high level of EO is observed more among men compared to women. This seems to confirm that men are more autonomy oriented, pro-active and innovative. Also attainment at school is positively related to EO. Farmers who attended school for a longer period of time may be better in record keeping, reading and coping with changes, compared to farmers with less education. MO is determined by the total size of productive fields, the number of crops and distance to the market. These determinants have generally more to do with tradable volumes. The ability of farmers to go to markets further away (urban) determines their ability to cope with higher costs and trading skills. From the focus groups I noticed that large farmers fill their truck with potatoes of smaller farmers to make transport to urban-markets more profitable. A way to increase volumes is to cooperate, this way also other crops can be taken to the market and the physically long distances to urban markets become less of a barrier. Thus by group ‘entrepreneurship’ increased market orientation could be realised. This finding is especially relevant for the districts that are located further away from the main markets. Musanze already has a well-developed market for potatoes. Farmers in the surrounding districts in the west (Rubavu) and north-east (Burera) of Musanze could work more closely together – e.g. by realising collection centres – to reduce costs to realise a market approach.

Main finding 3: “There is a negative relation between EO and MO”

Contradictory to the theory a negative relation is found between EO and MO. A negative effect has to do with the focus of EO. EO is focussed merely on production improvement and the possibilities to improve the business on the field while MO is focussed on improvement of the business outside the field. This means that farmers that are production oriented are less market oriented. Some scholars argue that entrepreneurs cannot fulfil all entrepreneurial dimensions (Li et al., 2008; Lumpkin and Dess, 1996; Merlo and Auh, 2009) while others say that this is necessary to become a successful entrepreneur. Most potato farmers focus on increasing the productivity before challenging the market. Therefore, EO could negatively influence MO because the current level of a large share of farmers is not yet ready to make the next step of development. Looking in the literature this has a strong connection with the concepts of ‘farmers as farmers’ and ‘farmers as entrepreneurs’. The first group is known as necessity farmers that have a risk-averse attitude while the second is focussed on agricultural opportunities.

Main finding 4: “Growing the market varieties is negatively related to the level of EO”

The regression analysis showed that farmers growing the market varieties Kinigi, Sangema or Victoria have a lower level of EO. From the interviews and focus group discussion I observed that the Kinigi variety is exhausted and gives a high risk of harvest failures. Based on the risk-taking dimension, farmers may have decided that market varieties negatively contribute to income although this variety is attractive at the urban market. On the other hand, the Cruza variety (strong variety but not demanded from the market) - which is a common variety for consumption in the rural areas - is not demanded in urban areas, but the variety is more resistant against hazards, diseases and viruses. Cruza is grown by farmers with a higher level of EO. This result is surprising, although the analysed farmers are part of the FFS program and production oriented there is still a focus expected towards the market. A result is that reliable varieties are more interesting than market varieties from the market.

6.2 Recommendations for the development of FBS

According the first main finding an imbalance exist between EO and MO. On individual level I saw that leadership and market orientation is only present in a small group of respondents. Therefore, it is recommendable to bundle these strengths among multiple FFS groups. Where production orientation is merely focussed on the individual farmer, MO needs to happen at group level and it is important to stimulate the roles that already exist. In this way, leaders and market oriented farmers can stimulate

the market orientation in the group. The FBS facilitator can teach multiple leaders and market oriented farmers from different groups to further develop their skills and knowledge.

However, farmers prefer to work only with their own group. Some groups have to cooperate with other FFS groups to create economies of scale. Two formats are possible to implement FBS: (1) multiple groups set up one big group or (2) the leaders and MO farmers set up a FBS committee to keep the FFS groups, associations or cooperatives for what they are and start a cooperation program on the basis of a committee. Original FFS groups can participate by selling their crops with other participating groups connected to the FBS committee. The committee will link stakeholders, traders and transporters. This committee has support from their FBS facilitator and RAB/BTC. According the regression is analysed that differences exist and therefore a different development among farmers will exist. A positive impact means that the opportunity seekers from different FFS groups could work together more closely that will benefit also the less fortuned farmers.

According the second main finding personal characteristics like education and participation should strongly be taken into account, because this influences the EO and MO. Therefore a decision could be made by policymakers by choosing for men and farmers that at least finished primary school or mix the groups with all characteristics. The size of land determines the ability of farmers to be market oriented because this creates more economies of scale, more economies of scale not only means to produce more potatoes but also diversifying becomes economically more beneficial. A larger number of crops also positively influence MO. The implementation of the explanatory variables merely depends on the vision that could be set up by the implementers. A vision could focus; (1) without distinction, focus on development of each individual farmer participating FFS or (2) focus on farmers that show to have the right characteristics and resource endowments. So it is recommendable to focus on the farmers that own enough land or are able to rent more land to produce enough for the market. When these groups are too small relating to the size of the fields, the focus could be put on creating cooperation between smaller farmers. Another suggestion what is explained above by having representatives being active in FBS committees. The FBS should focus on the creation of more land, stimulate responsibilities among women and also stimulate households to bring their children to secondary schools and finish the secondary school to become an entrepreneurial farmer in the future. Furthermore it is good to grow more crops not only because it is good for rotation but also because it is good feed for the livestock that produce quality manure.

Finally, many farmers own a mobile phone or radio. This type of tool can be used more often to stimulate MO. Facilitators can teach the farmers the benefits and how to access information from organisations like RAB or attract market information from traders and market men. This tool can thereby help to decrease physical distances. This way also farmers can inform themselves by phone while before farmers had to visit markets physically or good communication with other farmers. Accessing markets themselves wasn’t always possible due to transport costs and challenges.

The third main finding indicates that working together could help to raise market participation of the potato farmers. FBS can play a role by focussing on working together within a group or with other groups to access markets more easily and to reduce transaction costs. FBS can benefit of the experience from FFS. The SPAT 2 program showed that facilitation of the groups is a key to the development of the FFS participants. Facilitation triggers farmers to further develop their EO and MO. Because on average farmers score high on EO but low on MO, this research shows that a lot of development can be realised by further development of MO in the concept of FBS. Additionally, more integration within the value chain is necessary to add value and decrease transaction costs (Obi, 2010).

According the fourth main finding it is important to take into account the problem of low quality seed. Although more quality seed is in production a large part of the farmers still does not trust that quality seed has the right quality according the prices and risks. Realising MO among farmers goes together with the right tools like high quality seed potatoes. Talking to potential seed suppliers the problem

arise because Rwanda invest to develop their own seed. It will take many more years to produce enough own high quality seed potatoes to supply all the farmers. Therefore it is recommended to set up multiplication programs for high quality varieties. Without change of improvement farmers will remain supply driven instead of demand driven. Countries like Kenya already decided to import seed potatoes to further develop it themselves through seed potato multiplication programs. A better quality seed that is demanded from the market might influence positively the entrepreneurial orientation of farmers because farmers will experience more benefits from high quality seed.

7. Conclusion

The objective of this research is: *Identify the present state of entrepreneurial orientation and market orientation of potato farmers in Rwanda to address the deficits that could be minimized by a Farmer Business School approach.*

The entrepreneurial orientation of Rwandan potato farmers is good. Respondents generally scored well on the seven dimensions of EO. MO on the other hand is poorly developed. The latter can be explained by a number of factors: farmers face many difficulties related to infrastructure; they choose to grow local varieties because market varieties are more risky; farmers are willing to focus on MO only when they have enough land so that they can sell their surplus harvest at the urban markets. Musanze district has more market oriented farmers than other districts due to the geographical location, better infrastructure and fertile soils that attract NGO’s and governmental assistance.

FBS is an addition of FFS focussed on the market and post-harvest activities by integrating the farmer into the value chain. The analysis indicates that farmers generally have very poor access to the value chain. Farmers have poor access to stakeholders and are dependent on information from their facilitator in the FFS. FBS can contribute to overcome these problems.

Because farmers have small plots and many female and low educated farmer entrepreneurs exist, it is important to invest in a FBS that focuses on the diversity of the farmers. To accomplish economies of scale the strong instruments like cooperatives or farmer associations can be further developed through FBS cooperatives or associations. Another recommendation is to start ‘market oriented committees’ that bring market oriented farmers and leaders of different FFS groups together to stimulate cooperation and sell their crops at the right markets. Strong cooperatives, associations or committees can share the risks and cope with common difficulties by working and transporting the potatoes together. Long distances to markets cause high input costs, lower output prices, fewer buyers, weak access to supporting services and less opportunities to add value. To create this ability to move to new markets entrepreneurial competences are necessary to develop market opportunities. Farmer groups are mixed and therefore it is important to mix the FBS groups

During the research several limitations are noticed. This research focussed on the attitude of the farmers but did not focus on the skills and knowledge of the farmers. Also no other FBS is currently operational what makes this research an exploratory study. Because no other FBS exist currently in Rwanda it is not possible to test which knowledge and skills are missing. Also a control group was therefore not possible to implement in the study. Because the case study of the research is executed in Rwanda some changes had to be made in the questionnaire during the field work. Respondents were unable to answer all questions and some questions have been interpreted wrongly. For some variables it was impossible to find exact indicators, such as the economic well-being of the farmers. As a result, only indirect income indicators are used, such as assets. Due to a relatively short stay and the ambitious research design, including a farm survey, focus group interviews, rich picture analysis and key stakeholder interviews, the field work was performed under a certain degree of time pressure. Furthermore, as an MSc student from the Netherlands who does not speak the local language, I encountered some communication problems and interpretation errors may be present.

Along the way of this research several opportunities for future research are noticed. The following five options are suggested for further research. (1) Due to shortage of time the skills and knowledge is not described in detail that is necessary to develop FBS. The same reason applies for mapping the value chain. Throughout this value chain analysis partners for FBS can be found to cooperate with the farmers during the FBS to further integrate in the value chain that is key to MO. (2) During the research I have seen farmers that have a large production plot but are not using support from the FFS. It might be interesting to see how these farmers developed their farm as a business compared to FFS farmers. (3) Skills and knowledge is not tested in the field. Therefore follow-up studies could focus

more specifically on skills and knowledge training. (4) This research is focussed on potato farmers. Because FFS is widely implemented on other crops as well, it would be interesting to see whether other crops have the same results.

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A. Annex Descriptive tables

Annex A.1: Questionnaire translated

	muri rusange	**General**
	kode	***Code***
1	**ubaza**	**Interviewer**
2	**numero y usubiza**	**Respondent Number**
3	ufite imyaka ingahe ?	What is your age
4	igitsina ?	Gender
5	irangamimerere ?	Marital status
6	ufite abana bangahe ?	Children
7	umukuru w" urugo ninde ?	Who is the head of the family
8	mukoresha uruhe rurimi ?	Which languages
9	language 2	language 2
10	Language 2	Language 3
11	uzi gusoma ?	For me it is easy to read
12	wize amashuri angahe ?	What is your highest attained level of education
13	hari andi mahugurwa wakoze ?	Other educational trainings
14	Intara	Province
15	Akarere	District
16	Umurenge	Sector
17	Akagari	Village
18	umudugudu	Cell
19	Waba warakoreye muri IAMU (Ishuri ry'Abahinzi mu m'Umurima)	FFS years of experience
20	umaze imyaka ingahe mubuhinzi ?	Years of farming experience in potato (approximately)
21	ufite igare , kuva ryari ?	I own a Bicycle, since
22	since	Since
23	ufite imashini ihinga, kuva ryari ?	I own a Tractor, since
24	since	Since
25	ufite moto, kuva ryari ?	I own a Moto, since
26	since	Since
27	ufite inka ? Niyawe cyangwa ni indagizo ?	I own … Cows
28	ufite ingurube ? Niyawe cyangwa ni indagizo ?	I own … Pigs
29	ufite ihene ? Niyawe cyangwa ni indagizo ?	I own … Goats
30	ufite inkoko /	I own … Chickens
	amakuru kubijyanye nubutaka	**Land information**
31	ufite hegitare zingahe zubutaka buhingwaho ?	What is the total size of your field you use for production in ha
32	murugo rwawe murya ibiro bingana iki byumusaruro wanyu mweza ?	What percentage (or kg) of the yield of all your potatoes you use for householdconsumption
33	mujyana ku isoko ibiro bingahe byumusaruro wanyu mweza ?	What percentage (or Kg)of the yield of all your potatoes you use for the market

34	mubika imbuto y''ibirayi ingana gute mumusaruro mweza ?	What percentage (or KG) of the yield of all your potatoes you use for seedlings
35	nubuhe bwoko bwubutaka muhingaho ?	Soil Type
36	nibihe bihingwa bindi muhinga nyuma y ibirayi, ni urutoki ?	What other crops you produce besides potato (Banana)
37	ikawa ?	What other crops you produce besides potato (Coffee)
38	imyumbati ?	(Cassava)
39	ibishyimbo ?	(beans)
40	icyayi ?	(Tea)
41	soya ?	(Soybean)
42	ibigori ?	(Maize)
43	ni dodo, imbwija ?	(local vegetables)
44	imbuto ?	(other fruitcrops)
45	ingano ?	(wheat)
46	ibindi ?	(Other)
47	niyihe mbuto y ibirayi muri guhinga cyane muri ikigihe kihinga ?	What potato variety you grow this season (main)
48	nubuhe bwoko bwimbuto y ibirayi muri guhinga muri ikigihe kihinga(iyindi mukunda)?	What potato variety you grow this season(second)
49	nubuhe bwoko bwimbuto yi ibirayi muri guhinga ?	What potato variety you grow this season(third)
50	niyihe mbuto y ibirayi mwahinze cyane mugihe kihinga gishize ?	What potato variety you grow last season (main)
51	niyihe mbuto y ibirayi mwahinze murugero ruringaniye mugihe kihinga gishize ?	What variety of potato you grow last season(second)
52	niyihe mbuto yindi y ibirayi mwahinze mugihe kihinga gishize ?	What variety of potato you grow last season(third)
53	hari umuti mugura wo gutera kubirayi wica udukoko	Do you buy insecticides for your potatoes
54	mujya mugura ifumbire mva ruganda yo gukoresha mu buhinzi bw ibirayi ?	Do you buy industrial fertilizer for your potatoes
55	mujya mugura ifumbire y imborera yo gukoresha mubuhinzi bw ibirayi ?	Do you buy organic fertilizer for your potatoes
56	mujya mugura imbuto mukoresha muhinga ibirayi ?	Do you buy seeds for your potatoes?
	udushya	**Innovativeness (subtitle)**
57	niryari waba warabonye imbuto yakongera umusaruro wawe ?, warayigerageje ?	When there is a new variety that can possibly increase my harvest I test it
58	haba hari abaguhaye ubufasha byukuntu wakongera umusaruro ? Ese wemeye kubugerageza ?	When an extension officer/facilitator explain me how I can improve my production I am eager to test it
59	es uramutse umenye ko wogeje cyangwa ugafunga ibirayi mu mapaki bwakongera igiciro ugurishaho wabikora ?	If I know that I can get a higher price when i wash or package my potatoes i will wash or package the potatoes
60	wabikora wenyine cyangwa wabikorera mwitsinda hamwe nabandi ?	IF YES: 60. would you do it as a group or individual
61	ese kubikorera mwitsinda aribyo byiza wahitamo kuguma muri IAMU ukoreramo gusa cyangwa kwihuza nandi ma IAMU menshi nibyo byiza cyane ?	IF AS GROUP: Would you prefer to work with YOUR FFS group only or make a larger group of several FFS groups together?

62	waba ujya urebera kubandi bahinzi uburyo bakoresha bongera umusaruro ?	I go to other farmers to see how they produce differently than me
	kwirengera ibiba byose(ingaruka)	**Risk taking**
63	ese ukoresha amafaranga menshi ugura imbuto nziza kuko ikuzamurira umusaruro ?	I spend more money on quality seeds when this improves my production
64	ese usarura ibirayi byawe uruko byeze gusa ?	I only harvest my potatoes when the potatoes are fully grown.
65	ese usarura ibirayi aruko bifite igiciro cyohejuru ? Cyangwa ni vuba cyane bishoboka ?	When the prices are high, I harvest my potatoes as soon as possible
66	ese iyo ubona ko igiciro cyaziyongera muminsi izaza uhunika ibirayi byawe ?	If it is possible to gain a higher price later, I would try to store my potatoes
	Proactiveness	**Proactiveness**
67	wifuza gukora ibindi bikorwa abandi bahinzi batarakora ?	I am willing to start new activities that other farms do not do, yet
68	Byaba bikorohera gutangira ibikorwa bishya abandi bahinzi batarakora ?	It is easy to start new activities that other farms do not do, yet
69	ese niba gukorera mu itsinda byazamura inyungu yawe wakoresha imbaraga nyinshi kugirango uge mwitsinda rya bahinzi bi birayi ?	If it can increase my income by working in groups, I would make an effort to work together with other farmers to sell my potatoes, (because the truck can come to pick up more potatoes at the same time)
70	ese wumva wajya uba ariwowe uri imbere yabandi mu mirimo ijyanye no gusarura ?	I like to take the lead with such harvest activities
71	ese niwowe ubwawe ufata iyambere mugufata gahunda yokugurishiriza hamwe umusaruro nkitsinda ? no kuba ari wowe ubasha kugirana amasezerano nabaza kubigura cyangwa ubwikorezi?	I personally like to take the lead to ORGANIZE the group to be able to sell together as a group. This also includes making the contact or contract with the trader/transporter.
	isoko, aho riri, ako rihagaze	**Market orientation**
72	ujya ubaza abaguzi bawe cyangwa abakuguraho niba ibirayi ubagurishaho bibahagije ?	I ask my buyers whether they are satisfied about the potatoes I sell to them
73	ese uzi igiciro abakuranguraho bagurishaho ku masoko ?	I am aware at what price my trader sell the potatoes to the next buyer
74	ese hari amakuru ujya umunye yo ku muguzi wawe wanyuma (ujya kubiteka) uguraho ?	I am aware at what price the potatoes are sold to the final buyer
75	ese uzi igiciro cyu ubwikorezi kuva aha ujya i kigali ?	I know the costs of transporting the potatoes from here to Kigali
76	ese igihe ushakiye kuvuga nabaguzi bawe kuri telefone uhita ubikora ?	When I want to contact my buyer, I can contact him or her by phone now
77	ese hari izindi numero za telefone zabandi baguzi bakomeye waba ufite ?	I also have phone contact numbers of others potential buyers
78	usagurira amasoko aruko wabanje kwihaza iwawe ?	I first focus on my household consumption and after on the market
79	ujya ugerageza kureba abaguzi bawe cyangwa abakuranguraho ko bifuza kuzongera kugura nawe mugihe kihinga gitaha ?	I try to find out what my buyers want to buy from me in the next season
80	usibye abakiriya bawe usanganwe ujya ureba nibyo abandi bakeneye ?	I know what other buyers than my current buyers want
81	uzi aho abakuranguraho bacururiza ?	I know where my traders sell the potatoes
82	ujya ureba niba aribyiza kuba wahindura abakiriya warusangannye ugashaka abandi ?	I check whether it’s better to sell my products to another buyer than my current buyer

	uburyo	**Strategy**
	kugabanya ibbiciro	**Cost reduction**
83	uzi agaciro ku umsaruro wawe(mu mafaranga)	I know the costs of my production
	kongera aho uhinga(kongera umusaruro ntago ari ibyo winjiza mu mafaranga)	**Increase scale (be aware this is about YIELD not <u>income</u>)**
84	ujyerageza ko ngera umusaruro wawe kuri are ?	I try to increase my production per are
85	umusaruro wawe waba waratingiye kwiyongera umwaka ushize ?	My yield increased since last year
86	ese umurima uhingaho ibirayi ujya ugerageza kuwongera ?	I try to increase my field for production of irish potatoes
	kongera ibyagufasha	Increase sustainability
87	ese umusaruro wawe wiyongera buri mwaka ?	My income increases every year
	uburenganzira	Access
88	hari amasezerano wasinyanye cyangwa wagiranye numuguzi ?	Did you ever sign a contract with a buyer
89	waba warigeze ugurisha ibirayi utarabisarura (bikiri mumurima) ?	Did you ever sold your potatoes before harvesting
90	ese ujya wumva ushishikajwe no kugirana amasezerano yo kugurisha numuguzi wawe mugihe ibirabi bikiri mu murima ?	Would you be interested to sign contract to sell while they are still in the field (sign a contract to sell in the future when the potatoes are mature)
91	ese waragurishije ibirayi bikiri mumurima ukabona undi iufite igiciro kiri hejuru wakongera ukabigurisha bwakabiri ?	If you would have signed a contract for the future to sell your potatoes would you still sell the potatoes to someone else when they offer a better price?
92	ese urizera ko imbuto yibirayi ari nziza ?	I trust that the irish potato seed bought has a good quality
93	ninde uguraho imbuto ?	From whom do you buy seeds
94	wishyura amafaranga menshi ku mbuto nziza zu bwoko bumwe igihe uzi neza ko idafite indwara cyangwa imera neza ?	I would pay more for my seed of the same variety when I am sure this seed has no disease and has a better germination rate
95	ukunda imbuto zifite ibyongombwa kuruta izabaturage ?	I prefer certified seeds more than local seeds. (farmer saved seed = no certification)
96	hari urugendo rungana iki hagati yaho ukorera ubuhinzi bwawe ni soko ?	what is the distance to the nearest market from the potatofield
97	ninde uranguzaho umusaruro wibirayi byawe ?	To whom do you sell your potatoes
98	niwowe ubwawe wigira kuranguza ?	I go to the nearest market myself
99	kugurisha umusaruro wawe mubantu bishyize hamwe nibyo byiza kuruta kuwujyana ku masoko ?	Selling at the farmgate is more beneficial than selling at the market
100	ufata inguzanyo kugirango ukore ubuhinzi bwawe ?	I took a loan for production
101	ntabwo ujya ufata inguzanyo ?	I do not have a loan because
102	ese biroroshye kubona inguzanyo ?	It was easy to get a loan *(in case they answer 'yes' in have a loan)*
103	niwowe ubwawe wisabira inguzanyo ?	I go to financial institutions myself
104	ujya wumva ushishikajwe no kwaka inguzanyo ?	I would be interested to go to a financial institutions for credit
105	nihe ukura inguzanyo ?	I get a loan from
106	nihe ukura inguzanyo ?	I get a loan from

107	hari abantu bandi mukorana bagufasha guteza imbere imurimo wawe ?	I work together with people who can help me improving my business
108	hari ibindi bintu ujya ukoresha mubuhinzi bwawe ?	I have good access to input
109	hari ikindi wakongeraho cg ikibazi ufite ?	Do you have any other comments or guestions

Annex A.2 Farmer characteristics and resource endowments

Variables	Scales	Percentage N(%)	Mean	Mode	SD
Gender	Male	100 (54.9)	0.45	0	0.499
	Female	82 (45.1)			
Age	15-20	6 (3.3)	5.29	4	2.067
	21-25	3(1.6)			
	26-30	27(14.8)			
	31-35	36 (19.8)			
	36-40	35 (19.2)			
	41-45	21 (11.5)			
	46-50	22 (12.1)			
	51-55	19 (10.4)			
	56-60	7 (3.8)			
	61-65	5 (2.7)			
Marital status	Single	10 (5.5)	2.10	2	0.596
	Married	158 (86.8)			
	Widowed	14 (7.7)			
Children	0	10 (5.5)	4.22	2/5	2.335
	1	12 (6.6)			
	2	29 (15.9)			
	3	20 (11.0)			
	4	28 (15.4)			
	5	29 (15.9)			
	6	20 (11.0)			
	7	17 (9.3)			
	8	13 (7.1)			
	9	2 (1.1)			
	10	2 (1.1)			
Literacy level	No	31 (17.0)	0.83	1	0.377
	Yes	151 (83.0)			
Education level	Never	28 (16.4)	1.98	2	0.820
	Primary	130 (71.4			
	Secundary	24 (13.2)			
Total size of production fields	0.1-0.5 ha	78 (42.9)	2.20	1	1.503
	0.6 – 1ha	43 (23.6)			
	1.1 -1.5 ha	36 (19.8)			
	1.6 -2.0 ha	3 (1.6)			
	2.1 – 2.5 ha	12 (6.6)			
	3.1 – 3.5ha	7 (3.8)			
Total amount crops	1	3 (1.6)	3.68	4	1.369
	2	40 (22.0)			
	3	41 (22.5)			
	4	50 (27.5)			
	5	28 (15.4)			
	6	17 (9.3)			
	7	2 (1.1)			
	8	1 (0.5)			

FFS experience	>1	17 (9.3)	2.23	1	1.076
	1	64 (35.2)			
	2	29 (15.9)			
	3	60 (33.0)			
	4	7 (3.8)			
	5	4 (2.2)			
Farming experience	1-5 years	67 (36.8)	2.40	1	1.548
	6-10	49 (26.9)			
	11-15	26 (14.3)			
	16-20	23 (12.6)			
	21-25	3 (1.6)			
	26-30	11 (6.0)			
	31-35	3 (1.6)			
Cow	none	84 (64.2)	0.77	0	0.911
	1	67 (36.8)			
	2	23 (12.6)			
	3	7 (3.8)			
	6	1 (0.5)			
Pigs	None	147 (80.0)	0.24	0	0.533
	1	26 (14.3)			
	2	9 (4.9)			
Goats	None	87 (47.8)	1.18	0	1.622
	1	36 (19.8)			
	2	28 (15.4)			
	3	17 (9.3)			
	4	9 (4.9)			
	5	3 (1.6)			
	8	1 (0.5)			
	12	1 (0.5)			
Chickens	None	137 (75.3)	0.90	0	2.012
	1	8 (4.4)			
	2	12 (6.6)			
	3	5 (2.7)			
	4	7 (3.8)			
	5	5(2.7)			
	6	4 (2.2)			
	8	2 (1.1)			
	10	1 (0.5)			
	13	1 (0.5)			
Bicycle	No	152 (83.5)	0.16	0	0.372
	Yes	30 (16.5)			
Tractor	No	182 (100.0)	0.00	0	0.000
Moto	No	180 (98.9)	0.01	0	0.105
	Yes	2 (1.1)			
Soil type	Sandy	12 (6.6)			
	Clay	57 (31.3)			
	Volcanic	74 (40.7)			
	Other	11 (6.0)			
	Sandy and clay	23 (12.6)			
	Sandy and volcanic	3 (1.6)			
	Clay and Volcanic	2 (1.1)			

Annex A.3: Crops

Crop	Number of crops	Percentage
Bananas	12	6.5
Peas	30	16.3
Cassava	15	16.6
Beans	173	95.1
Tea	18	9.9
Sorghum	48	26.4
Maize	165	90.7
Local vegetables	60	32.9
Other fruit	12	6.6
Onion	6	4.9
Wheat	64	35.2
Sweet potato	47	26.0
Cabbage	12	6
Pyrethrum	10	5.5
Carrots	7	3.3
Soybean	2	0.5

Annex A.4 Districts

	Frequency	Percent
Musanze	36	19.8
Burera	34	18.7
Gicumbi	35	19.2
Rubavu	38	20.9
Nyamagabe	39	21.4

Annex A.5: Sector

	Frequency	Percent
Musanze	5	2.7
Nyundo	6	3.3
Nyakiribi	6	3.3
Kanama	13	7.1
Busasamana	9	4.9
Mudende	3	1.6
Cyanzarwe	1	.5
Uwinkingi	26	14.3
Tare	12	6.6
Kitabi	1	.5
Kinigi	12	6.6
Nyange	19	10.4
Gahunga	15	8.2
Cyanika	13	7.1
Ruragama	6	3.3
Mutete	15	8.2
Miyove	20	11.0
Total	182	100.0

Annex A.6: Village

	Frequency	Percent
Kaguhu	6	3,3
Cyahi	6	3,3
Musenyi	8	4,4
Nyarubuye	6	3,3
Gakenke	10	5,5
Miyove	5	2,7
Mubuga	5	2,7
Gaseke	1	,5
Karambo	2	1,1
Musabike	4	2,2
Mahoko	3	1,6
Cyabagarura	4	2,2
Kigarama	2	1,1
Nyarushyamba	2	1,1
Kamuhoza	4	2,2
Kayungwe	1	,5
Kanyepubwe	1	,5
Yungwe	3	1,6
Gikumbi	3	1,6
Nyalyonga	6	3,3
Micinyiro	3	1,6
Kampanga	6	3,3
Rusura	1	,5
Gasiza	1	,5
Makoro	1	,5
Ryabizige	1	,5
Mudasomwa	19	10,4
Munyege	7	3,8
Nkumbure	11	6,0
Mujoga	1	,5
Gatove	1	,5
Cyabagarura	1	,5
Kivugiza	7	3,8
Muhabura	12	6,6
Kidakama	15	8,2
Nyagahinga	9	4,9
Kagitega	4	2,2
Total	182	100,0

Annex A.7: Cell

	Frequency	Percentage
Kaniga	6	3,3
Mubuga	3	1,6
Kabindi	3	1,6
Kabyimana	2	1,1
Musave	4	2,2
Sirwa	1	,5
Gahonga	1	,5
Gakenke	1	,5
Ntarama	1	,5
Nyabihu	3	1,6

Busura	4	2,2
gikeri	4	2,2
Icombi	1	,5
Kajevuba	2	1,1
Kavumu	2	1,1
Gasebeya	2	1,1
Karambi	8	4,4
Nkenzi	4	2,2
Karwamiro	3	1,6
Kibwa	1	,5
Nyamiyaga	1	,5
Rembero	1	,5
Rutindo	5	2,7
Murehe	2	1,1
Kacyiru	5	2,7
Runyinya	1	,5
Museke	2	1,1
Kivomo	2	1,1
Rugauda	1	,5
Miyove	1	,5
Kagote	1	,5
Ndongoshori	1	,5
Mutanda	1	,5
Rubara	1	,5
Kagano (Rubavu)	2	1,1
Shusho	1	,5
Rukore	3	1,6
Kivumu	1	,5
Nyamigogo	1	,5
Butagara	1	,5
Busesa	1	,5
Nyakabungo	1	,5
Nyakibande	2	1,1
Yungwe	2	1,1
Gikere	1	,5
Gikomero	1	,5
Rushubi	2	1,1
Kara	1	,5
Cyanika	2	1,1
Rugerero	2	1,1
Kanyamitura	1	,5
Gasiza	2	1,1
Nyarurembo	1	,5
Rebero	1	,5
Kagarama	1	,5
Kagano	7	3,8
Kacyiru (Rubavu)	1	,5
Kibavu	1	,5
Kingogo	2	1,1
Muhuhuri	1	,5
Gicaca	2	1,1
Karambo	5	2,7
Munyenge	6	3,3
Rushubi (Nyamagabe)	1	,5
Uwanjyogoro	10	5,5

Rugwiro	4	2,2
Bijaba	1	,5
Muhumo	4	2,2
Ryufe	1	,5
Kibwiji	1	,5
Gahembe	3	1,6
Bireka	2	1,1
Biraro	1	,5
Kigusa	1	,5
Bukingo	8	4,4
Kidakama	8	4,4
Total	182	100,0

Annex A.8: Crosstable Market channel * personally go to market

		Personally go to market					
		Never	**Sometimes**	**often**	**Always**	**As a group**	**Total**
Market channel	**None**	3	0	0	0	0	**3**
	Trader	5	1	0	1	0	**7**
	Transporter	19	11	4	10	1	**45**
	Market	0	8	5	43	0	**56**
	on the field	12	5	13	14	0	**44**
	Restaurant	1	2	2	0	0	**5**
	Transport by bike	4	0	1	0	0	**5**
	Transport by head	11	1	0	0	0	**12**
	For other families	0	3	2	0	0	**5**
		55	**31**	**27**	**68**	**1**	**182**

Annex A.9: Crosstable 2nd Market channel * personally go to market

		Personally go to market					
		Never	**Sometimes**	**Often**	**Always**	**As a group**	**Total**
2nd Market channel	**None**	28	12	19	60	0	**119**
	Trader	0	0	0	2	0	**2**
	Transporter	1	0	2	2	0	**5**
	Market	1	3	1	2	0	**7**
	on the field	12	16	1	1	0	**30**
	Local market	0	0	1	0	1	**2**
	Restaurant	3	0	1	0	0	**4**
	Transport by bike	6	0	1	1	0	**8**
	Transport by head	3	0	0	0	0	**3**
	For other families	1	0	0	0	0	**1**
	Other farmers who want seed	0	0	1	0	0	**1**
		55	**31**	**27**	**68**	**1**	**182**

B. Annex: Factor Analysis

Annex B.1: Rotated component matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13
QA84	.787												
QA59	.785												
QA108	.756												
QA70	.753												
QA87	.648												
QA71	.617												
QA95	.592												
QA83	.571												
QA98	-.566												
QA85	-.551												
QA64	.520								,507				
QA69	.499												
QA75		.814											
QA77		.786											
QA74		.775											
QA76		.649											
QA72		.590											
QA79		.490											
QA66		.412											
QA89			.674										
QA81		.438	.622										
QA82			.554										
QA73		.466	.543										
QA57			.516										
QA80		.496	.500										
QA107				.878									
QA58				.863									
QA94					.779								
QA63					.758								
QA92					.480								
QA86													
QA100						.757							
QA104						.748							
QA61							.875						
QA60							.723						
QA67								.781					
QA68								.550					
QA65									-.786				
QA62										.695			
QA78										.665			
QA99											.691		
QA90												.672	
QA88												-.607	
QA91													.877

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 12 iterations.

With the factor analysis all ordinal attitude variables are included. It is done by using varimax with a selection on coefficients not smaller than 0.40 based on eigenvalues greater than 1.

C. Regression Market orientation

Above the table of Annex B.2 the changes in the dataset are explained because some dummies have to be implemented. The dummies are education (*1: no education, 2: primary school 3: not finalised secondary school, secondary school, higher education*), number of crops produced (all different crops are counted to one variable), variety (Variety Kinigi, Sangema and Victoria transformed to one variable). the ANOVA table in Annex B.2 shows there is a significant effect of the determinants on MO, $F(15:157) = 8.374$, $p < .001$. Annex B.3 shows the correlation table of MO to indicate correlations within selected independent variables. Children is excluded from the regression of EO and MO due to the high correlation with other independent variables. In Annex B.6 until Annex B.8 the tables are displayed that indicate the individual summary statistics of the significant influencing independent variables.

Annex D.1 show the ANOVA table of the regression with the selected variables, there is a significant effect of the determinants on EO, $F(14:153) = 4.122$, $p < .001$. Annex D.3 show the correlation table of EO to indicate correlations within independent variables. Annex D.4 and Annex D.5 show the ANOVA and linear regression tables to indicate the interaction without districts. In Annex D.6 until Annex D.10 the tables are displayed to indicate the individual summary statistics of the significant influencing independent variables.

For this regression the dependent variables Market Orientation (MO) and Entrepreneurial Orientation (EO) are tested to find the relationship with the independents variables based on individual characteristics, household level, assets, experience, product related variables, region

Dependent variable: MO or EO

Independent variables: Age, Gender, Total amount children, Literacy level, Education level, FFS experience, Farm experience, Total size of the field, livestock, crops district, Distance to market, amount of crops produced

MO=f(Age);f(gender); f(Total amount children), f(Literacy level), f(Education level), f(FFS experience), f(Farm experience), f(Total size of the field), f(livestock), f(total market varieties), f(Distance to market), f(amount of crops produced), f(districts

Changes in dataset:

- *Education* level need to be changed due incorrect scale. So it will be changed to *1: no education, 2: primary school 3: not finalised secondary school, secondary school, higher education (*transform → recode into different variables)
- *Amount of crops produced,* in the dataset there are dummies of the crops separately. To analyse the total number of crops produced by the respondent the dummies are counted. (transform → count values within cases)
- Amount of variety Kinigi
    - *transform → count values within cases Kinigi firstchoice both periodes)*
    - *transform → count values within cases Kinigi 2nd choice both periodes)*
    - *transform → count values within cases Kinigi 3rd choice both periodes)*
    - *transform → count values within cases Kinigi this season)*
    - *transform → count values within cases Kinigi previous season)*
    - *Transform → same for Victoria*
    - *Same for sangema*
    - *Same for Total of Sangema + Victoria + Kinigi*
- Amount of total livestock
    - *Transform → same as variety and crops*

Further specifications in the model

- The independent variable ‘Children’ will be excluded because it highly correlates with age (table 1). Assumingly a positive correlation exist with children and age.
- The independent variable district will be split up in dummies to analyse the significant relationship of each district in relation with MO.
- An extra variable varieties Kinigi, Victoria and Sangema will be added because those varieties are demanded on the Kigali market.
- The total number of rotational crops will be included to see whether specialisation have a diversification with MO
- The number of cows is added as an indicator of the assets they have.

Start analysis

To start the model we will begin with all the independent variables

To have a better understanding of the variables firstly the ANOVA table is shown and secondly the correlation table. Some independent variables are correlated. The marked pearson correlations show a significant correlation in between the independent variables of the test. Therefore some of the variables will be excluded to further analyse the relation of the independent variables with MO.

Annex B.2: ANOVA MO

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	76.343	15	5.090	8.374	,000[b]
Residual	92.385	157	,608		
Total	168,729	167			

a. Dependent Variable: MO
b. Predictors: (Constant), District Nyamagabe, Distance to the market, Age, Education level, FFS experience, Gender, Market variety, District Rubavu, Livestock property, Farming experience, EO, Total size of production field, District Musanze, Total amount crops, District Gicumbi

Annex B.3: Correlaton table regression MO

	MO	Age	Gender	Edu level	FFS exp	Farm exp	Child	Size field	Cows	N crop	Distanc market	Market varty	Musanze	Burera	Gicumbi	Rubavu	Nyamagabe
MO	1,000	,032	-,173	,142	-,102	,083	-,020	,302	,090	,038	,298	,197	,441	,172	-,079	-,198	-,274
Age	,032	1,000	-,099	-,102	,113	,381	,626	,182	,200	,165	-,011	-,049	-,102	,059	,062	-,057	,028
Gender	-,173	-,099	1,000	,042	,002	-,172	-,169	-,253	-,088	-,019	-,186	-,048	,008	-,220	,213	-,096	,095
Education level	,142	-,102	,042	1,000	-,179	-,006	-,153	,083	,033	-,011	-,001	,146	,085	-,030	-,120	,020	,049
FFS exp	-,102	,113	,002	-,179	1,000	-,006	,025	,190	,148	,052	-,065	-,090	-,384	,065	,299	,088	-,100
Farm exp	,083	,381	-,172	-,006	-,006	1,000	,425	,255	,058	-,007	,086	-,025	-,078	,119	-,243	,193	-,005
Children	-,020	,626	-,169	-,153	,025	,425	1,000	,075	,229	,156	,124	-,111	-,139	,031	-,043	-,010	,140
Field size	,302	,182	-,253	,083	,190	,255	,075	1,000	,220	,072	,278	,128	-,076	,209	-,011	,083	-,204
Livestock property	,090	,200	-,088	,033	,148	,058	,229	,220	1,000	,404	,078	-,028	-,063	-,162	,263	-,236	,190
number crops	,038	,165	-,019	-,011	,052	-,007	,156	,072	,404	1,000	-,048	-,013	-,082	-,265	,229	-,380	,477
Distance to market	,298	-,011	-,186	-,001	-,065	,086	,124	,278	,078	-,048	1,000	,171	,108	,013	-,103	-,008	,000
Market variety	,197	-,049	-,048	,146	-,090	-,025	-,111	,128	-,028	-,013	,171	1,000	,092	,062	-,093	,110	-,157
Musanze	,441	-,102	,008	,085	-,384	-,078	-,139	-,076	-,063	-,082	,108	,092	1,000	-,216	-,212	-,223	-,235
Burera	,172	,059	-,220	-,030	,065	,119	,031	,209	-,162	-,265	,013	,062	-,216	1,000	-,249	-,263	-,277
Gicumbi	-,079	,062	,213	-,120	,299	-,243	-,043	-,011	,263	,229	-,103	-,093	-,212	-,249	1,000	-,258	-,272
Rubavu	-,198	-,057	-,096	,020	,088	,193	-,010	,083	-,236	-,380	-,008	,110	-,223	-,263	-,258	1,000	-,287
Nyamagab	-,274	,028	,095	,049	-,100	-,005	,140	-,204	,190	,477	,000	-,157	-,235	-,277	-,272	-,287	1,000
MO	.	,339	,013	,033	,093	,142	,396	,000	,123	,311	,000	,005	,000	,013	,154	,005	,000
Age	,339	.	,100	,094	,073	,000	,000	,009	,005	,016	,443	,263	,093	,222	,213	,231	,357
Gender	,013	,100	.	,295	,488	,013	,014	,000	,130	,403	,008	,270	,460	,002	,003	,108	,110
Education level	,033	,094	,295	.	,010	,472	,024	,143	,338	,444	,497	,029	,137	,351	,061	,397	,265
FFS exp	,093	,073	,488	,010	.	,471	,375	,007	,028	,253	,201	,122	,000	,201	,000	,128	,099
Farm exp	,142	,000	,013	,472	,471	.	,000	,000	,228	,462	,133	,376	,157	,063	,001	,006	,474
Children	,396	,000	,014	,024	,375	,000	.	,167	,001	,022	,054	,076	,036	,347	,289	,448	,035
Field size	,000	,009	,000	,143	,007	,000	,167	.	,002	,177	,000	,049	,163	,003	,443	,143	,004
Livestock property	,123	,005	,130	,338	,028	,228	,001	,002	.	,000	,158	,357	,208	,018	,000	,001	,007
number crops	,311	,016	,403	,444	,253	,462	,022	,177	,000	.	,266	,432	,145	,000	,001	,000	,000
Distance to market	,000	,443	,008	,497	,201	,133	,054	,000	,158	,266	.	,013	,082	,434	,091	,459	,499
Market variety	,005	,263	,270	,029	,122	,376	,076	,049	,357	,432	,013	.	,117	,214	,114	,078	,021

Musanze	,000	,093	,460	,137	,000	,157	,036	,163	,208	,145	,082	,117	.	,003	,003	,002	,001
Burera	,013	,222	,002	,351	,201	,063	,347	,003	,018	,000	,434	,214	,003	.	,001	,000	,000
Gicumbi	,154	,213	,003	,061	,000	,001	,289	,443	,000	,001	,091	,114	,003	,001	.	,000	,000
Rubavu	,005	,231	,108	,397	,128	,006	,448	,143	,001	,000	,459	,078	,002	,000	,000	.	,000
Nyamagab	,000	,357	,110	,265	,099	,474	,035	,004	,007	,000	,499	,021	,001	,000	,000	,000	.

Annex B.4: Crosstable do you want a loan/why not applied for a loan

Do you want a loan/ Why you didn’t apply for a loan	Totally Disagree	Disagree	Agree	Totally agree	Total
I have a loan	0	0	10	32	**45**
I don't have guarantee	9	9	23	6	**47**
It is too expensive	2	3	14	1	**20**
I don't know where to get a loan	3	0	12	3	**18**
I do not see the benefits of having a loan	2	3	7	0	**12**
I never applied for a loan	7	0	3	0	**10**
can fail, to high risk	1	1	3	1	**6**
I can finance it myself	0	6	3	1	**10**
Because Climate change makes it difficult	0	0	1	0	**1**
it is necessary for production but cant get it	0	0	0	1	**1**
I plan it for the future	0	0	4	1	**5**
I have a loan for other crops	0	0	0	1	**1**
Takes too much time	0	1	1	0	**2**
I don't have an account	0	1	1	0	**2**
Total	**24**	**24**	**82**	**47**	**180**

The same test will be done without the variables children and districts.

Annex B.5: Linear regression MO

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	-1,036	,359		-2,890	,004
Age	-,011	,033	-,023	-,339	,735
Gender	-,124	,137	-,062	-,901	,369
Education level	,166	,079	,136	2,110	,037
FFS experience	,028	,049	,039	,561	,576
Farming experience	,028	,046	,044	,619	,537
Total size of production field	,099	,050	,146	1,974	,050
Livestock property	,070	,087	,058	,805	,422
Total number crops	,117	,062	,161	1,890	,061
QA96	,094	,027	,243	3,502	,001
Market variety	,064	,143	,029	,445	,657
EO	-,155	,070	-,155	-2,201	,029
District Musanze	,623	,231	,225	2,701	,008
District Gicumbi	-,602	,245	-,239	-2,463	,015
District Rubavu	-,702	,191	-,288	-3,681	,000
District Nyamagabe	-,994	,250	-,419	-3,978	,000

EO has a negative relationship on MO probably because other variables are included within this factor

Means of independent variables and MO

Annex B.6: Mean report MO/Total size of production field

Total size of production field	Mean	N	Std. Deviation
0,1 - 0,5 ha	-.22	73	.72
0,6 - 1 ha	-.04	42	.96
1,1 - 1,5 ha	.22	34	1.10
1,6 - 2,0 ha	-.31	3	.43
2,0 - 2,5 ha	.21	11	1.13
3.1 - 3.5	1.58	6	2.00
Total	.00	169	1.00

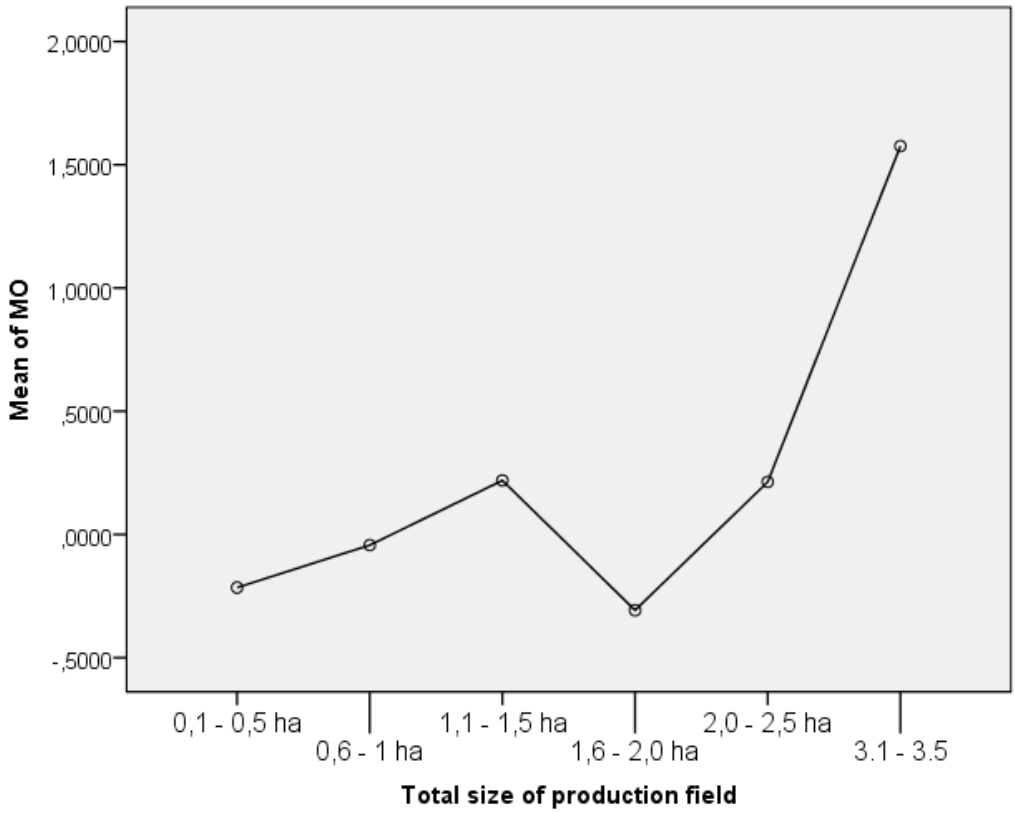
Annex B.7: Means report MO/Total size of production field

Distance to market	Mean	N	Std. Deviation
0 km	.23	2	.07
100 - 500m	.13	40	,84
501-1000m	.11	8	,36
1.1-2	-.12	35	,91

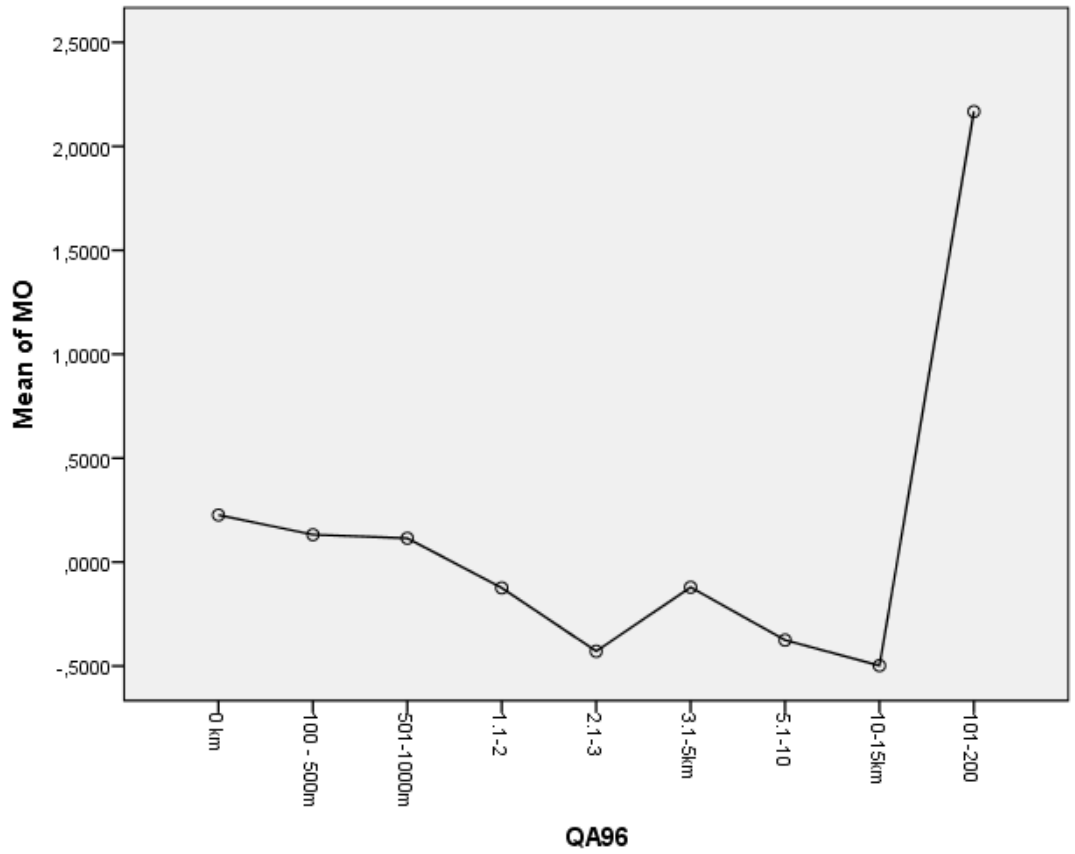
2.1-3	-.43	32	.43
3.1-5km	-.12	19	1.02
5.1-10	-.38	19	.46
10-15km	-.50	6	.20
101-200	2.17	11	1.50
Total	.00	172	1.00

Annex B.8: Mean report MO / Number of crops

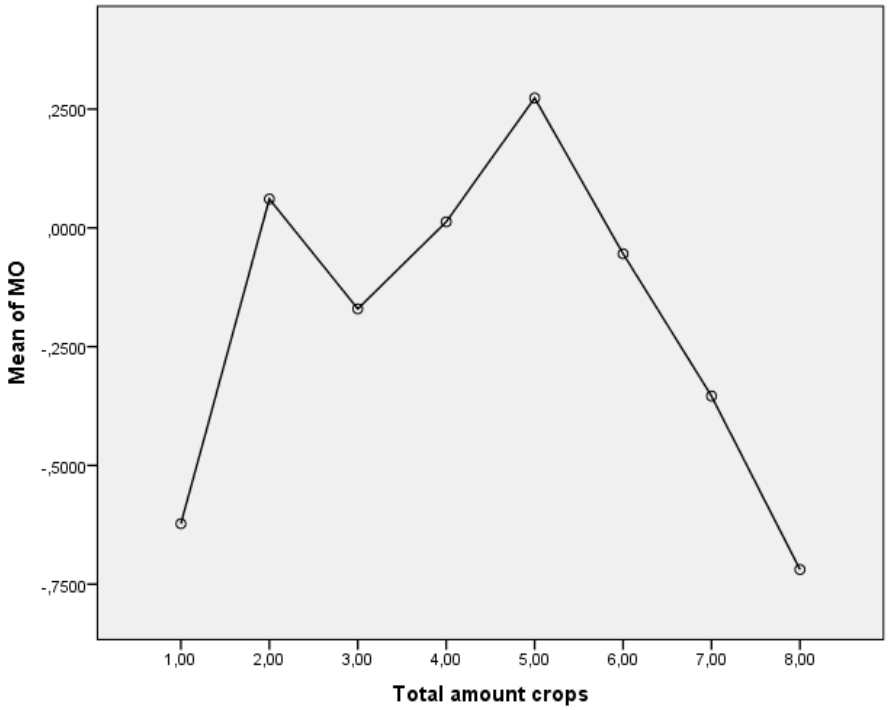
Number of crops	Mean	N	Std. Deviation
1,00	-.62	3	.30
2,00	.06	36	.91
3,00	-.17	37	.58
4,00	.01	49	1.15
5,00	.27	28	1.38
6,00	-.05	16	.78
7,00	-.35	2	.44
8,00	-.72	1	.
Total	.00	172	1.00



Graph B.1: The influence of field size to MO



Graph B.2: Influence distance to market to MO



Graph B.3: Influence Number of crops to MO

D. Regression Entrepreneurial orientation

This test will have the same model as Market orientation because concerning the theory EO has influence on MO. The same determinants will have influence on the orientation

EO=f(Age);f(gender); f(Education level), f(FFS experience), f(Farm experience), f(Total size of the field), f(livestock), f(total market varieties), f(Distance to market), f(amount of crops produced), f(districts)

Annex D.1: ANOVA linear regression EO

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	46,224	14	3,302	4,122	,000[b]
Residual	122,549	153	,801		
Total	168,773	167			

a. Dependent Variable: EO
b. Predictors: (Constant), Rubavu, Distance to market, Education level, Age, FFS experience, Gender, Market variety, Livestock property, District Musanze, Farming experience, Total size of production field, Total amount crops, District Gicumbi, District Burera

Annex D.2: Coefficients table EO regression

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	,100	,412		,244	,808
Age	-,055	,038	-,113	-1,445	,150
Gender	-,371	,155	-,184	-2,397	,018
Education level	,217	,089	,177	2,442	,016
FFS experience	,014	,056	,020	,243	,808
Farming experience	-,013	,053	-,019	-,238	,812
Total size of production field	,025	,058	,037	,440	,661
Livestock property	,109	,099	,091	1,101	,273
Total amount crops	-,084	,071	-,115	-1,178	,241
Distance to the market	,118	,029	,306	4,048	,000
Market variety	-,433	,160	-,199	-2,699	,008
District Musanze	-,493	,262	-,178	-1,885	,061
District Gicumbi	-,499	,278	-,198	-1,796	,075
District Rubavu	-,322	,217	-,132	-1,482	,140
District Nyamagabe	-,255	,286	-,108	-,892	,374
a. Dependent Variable: EO					

Annex D.3: Correlation table linear regression EO

	MO	Age	Gender	Edu level	FFS exp	Farm exp	Size field	Cows	N crop	Distanc market	Market varty	Musanze	Burera	Gicumbi	Rubavu
MO	1,000	,032	-,173	,142	-,102	,083	,302	,090	,038	,298	,197	,441	,172	-,079	-,198
Age	,032	1,000	-,099	-,102	,113	,381	,182	,200	,165	-,011	-,049	-,102	,059	,062	-,057
Gender	-,173	-,099	1,000	,042	,002	-,172	-,253	-,088	-,019	-,186	-,048	,008	-,220	,213	-,096
Education level	,142	-,102	,042	1,000	-,179	-,006	,083	,033	-,011	-,001	,146	,085	-,030	-,120	,020
FFS exp	-,102	,113	,002	-,179	1,000	-,006	,190	,148	,052	-,065	-,090	-,384	,065	,299	,088
Farm exp	,083	,381	-,172	-,006	-,006	1,000	,255	,058	-,007	,086	-,025	-,078	,119	-,243	,193
Field size	,302	,182	-,253	,083	,190	,255	1,000	,220	,072	,278	,128	-,076	,209	-,011	,083
Livestock property	,090	,200	-,088	,033	,148	,058	,220	1,000	,404	,078	-,028	-,063	-,162	,263	-,236
number crops	,038	,165	-,019	-,011	,052	-,007	,072	,404	1,000	-,048	-,013	-,082	-,265	,229	-,380
Distance to market	,298	-,011	-,186	-,001	-,065	,086	,278	,078	-,048	1,000	,171	,108	,013	-,103	-,008
Market variety	,197	-,049	-,048	,146	-,090	-,025	,128	-,028	-,013	,171	1,000	,092	,062	-,093	,110
Musanze	,441	-,102	,008	,085	-,384	-,078	-,076	-,063	-,082	,108	,092	1,000	-,216	-,212	-,223
Burera	,172	,059	-,220	-,030	,065	,119	,209	-,162	-,265	,013	,062	-,216	1,000	-,249	-,263
Gicumbi	-,079	,062	,213	-,120	,299	-,243	-,011	,263	,229	-,103	-,093	-,212	-,249	1,000	-,258
Rubavu	-,198	-,057	-,096	,020	,088	,193	,083	-,236	-,380	-,008	,110	-,223	-,263	-,258	1,000
Nyamagab	-,274	,028	,095	,049	-,100	-,005	-,204	,190	,477	,000	-,157	-,235	-,277	-,272	-,287

MO	.	,339	,013	,033	,093	,142	,000	,123	,311	,000	,005	,000	,013	,154	,005
Age	,339	.	,100	,094	,073	,000	,009	,005	,016	,443	,263	,093	,222	,213	,231
Gender	,013	,100	.	,295	,488	,013	,000	,130	,403	,008	,270	,460	,002	,003	,108
Education level	,033	,094	,295	.	,010	,472	,143	,338	,444	,497	,029	,137	,351	,061	,397
FFS exp	,093	,073	,488	,010	.	,471	,007	,028	,253	,201	,122	,000	,201	,000	,128
Farm exp	,142	,000	,013	,472	,471	.	,000	,228	,462	,133	,376	,157	,063	,001	,006
Field size	,000	,009	,000	,143	,007	,000	.	,002	,177	,000	,049	,163	,003	,443	,143
Livestock property	,123	,005	,130	,338	,028	,228	,002	.	,000	,158	,357	,208	,018	,000	,001
number crops	,311	,016	,403	,444	,253	,462	,177	,000	.	,266	,432	,145	,000	,001	,000
Distance to market	,000	,443	,008	,497	,201	,133	,000	,158	,266	.	,013	,082	,434	,091	,459
Market variety	,005	,263	,270	,029	,122	,376	,049	,357	,432	,013	.	,117	,214	,114	,078
Musanze	,000	,093	,460	,137	,000	,157	,163	,208	,145	,082	,117	.	,003	,003	,002
Burera	,013	,222	,002	,351	,201	,063	,003	,018	,000	,434	,214	,003	.	,001	,000
Gicumbi	,154	,213	,003	,061	,000	,001	,443	,000	,001	,091	,114	,003	,001	.	,000
Rubavu	,005	,231	,108	,397	,128	,006	,143	,001	,000	,459	,078	,002	,000	,000	.
Nyamagab	,000	,357	,110	,265	,099	,474	,004	,007	,000	,499	,021	,001	,000	,000	,000

The same model without districts

EO=f(Age);f(gender); f(Education level), f(FFS experience), f(Farm experience), f(Total size of the field), f(livestock), f(total market varieties), f(Distance to market), f(amount of crops produced)

Annex D.4: ANOVA table without districts

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	41,601	10	4,160	5,136	,000[b]
Residual	127,171	157	,810		
Total	168,773	167			

a. Dependent Variable: EO

b. Predictors: (Constant), Market variety, Total amount crops, Farming experience, FFS experience, Gender, Education level, QA96, Age, Livestock property, Total size of production field

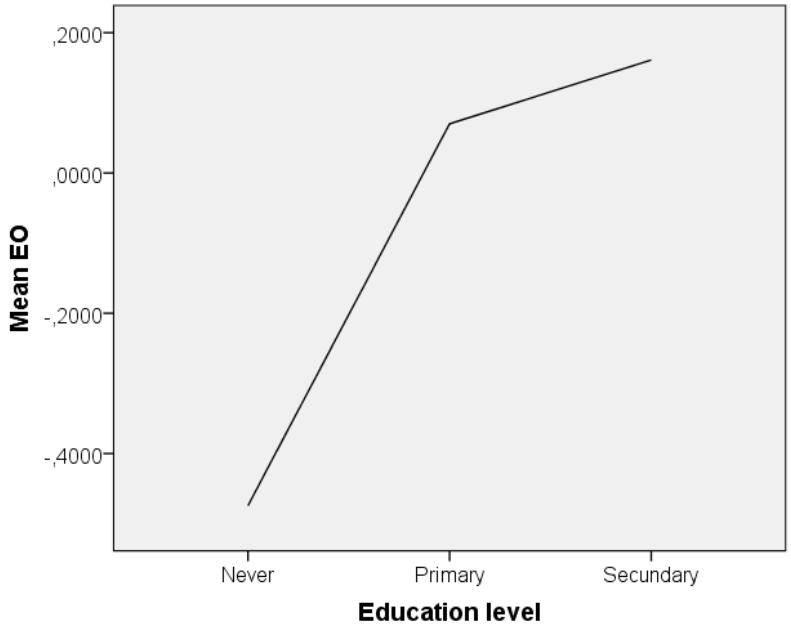
Annex D.5 Linear regression without districts

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	-,168	,385		-,437	,662
Age	-,054	,038	-,111	-1,423	,157
Gender	-,445	,147	-,221	-3,029	,003
Education level	,221	,089	,180	2,490	,014
FFS experience	,021	,052	,030	,410	,682
Farming experience	,006	,050	,009	,110	,913
Total size of production field	,038	,055	,056	,701	,485
Livestock property	,071	,095	,059	,753	,453
Total amount crops	-,100	,056	-,137	-1,792	,075
Distance to the market	,114	,029	,296	3,974	,000
Market variety	-,429	,156	-,197	-2,746	,007
a. Dependent Variable: EO					

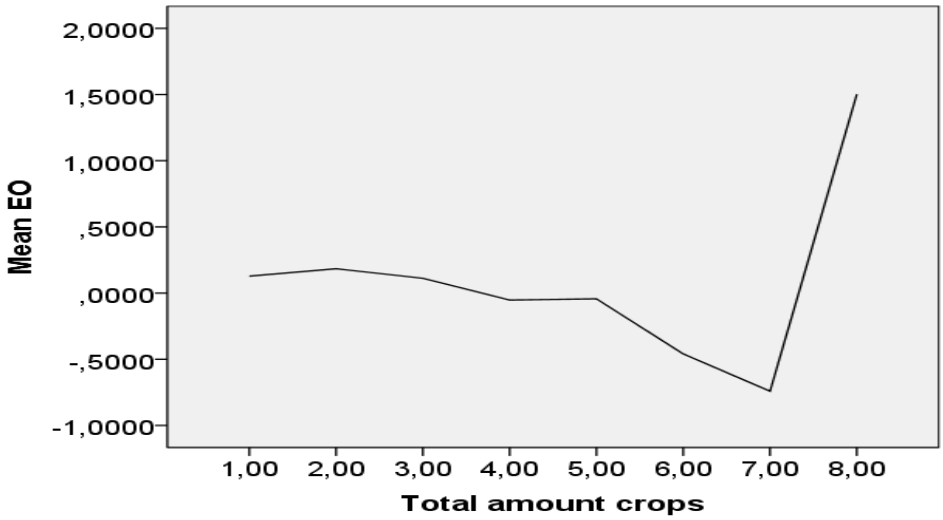
variables determine a significant relation with the level of EO. Gender (B: -.445***), Education level (B: .221***), Total amount crops (B:-.100**), Distance to market (B: .114***) and market variety (B: -.429***).

Annex D.6: Mean report EO / Education

Education	Mean	N	Std. Deviation
Never	-.47	26	1.08
Primary	.07	123	.98
Secundary	.16	23	.88
Total	.00	172	1.00



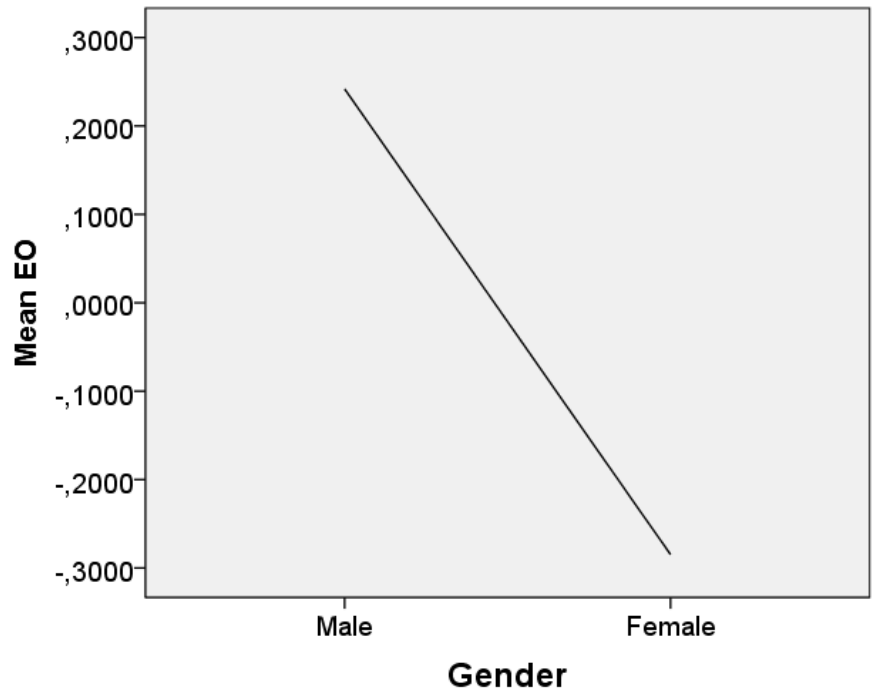
Graph D.1: Mean EO / Education level



Graph D.2: Mean EO / Total amount of crops

Annex D.7: Mean report EO / Number of crops

Number of crops	Mean	N	Std. Deviation
1,00	.13	3	.45
2,00	.18	36	1.05
3,00	.11	37	1.01
4,00	-.05	49	1.00
5,00	-.04	28	1.13
6,00	-.46	16	.53
7,00	-.74	2	.51
8,00	1.50	1	.
Total	.00	172	1.00



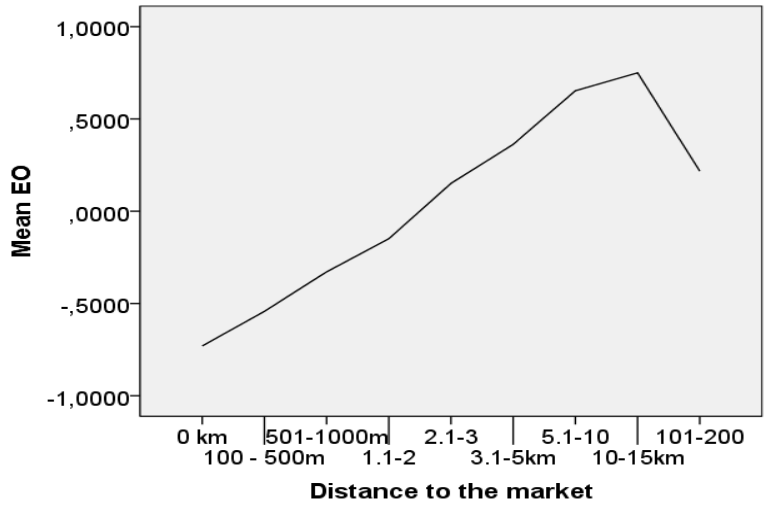
Graph D.3: Mean EO / Gender

Annex D.8: Mean report EO / Gender

Gender	Mean	N	Std. Deviation
Male	.24	93	.89
Female	-.28	79	1.05
Total	.00	172	1.00

Annex D.9: Mean report EO / Distance to the market

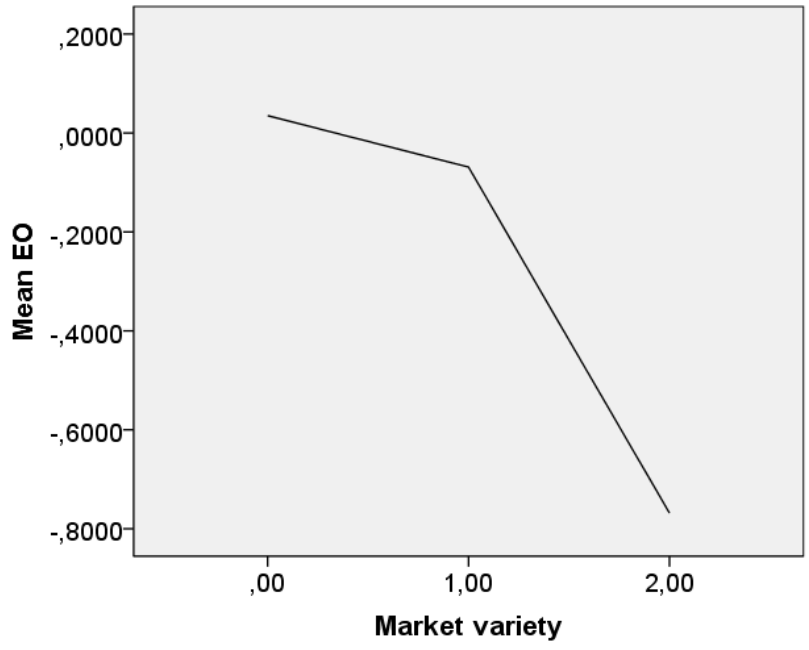
Distance to market	Mean	N	Std. Deviation
0 km	-.73	2	.40
100 - 500m	-.54	40	.83
501-1000m	-.33	8	1.03
1.1-2	-.15	35	1.04
2.1-3	.15	32	.99
3.1-5km	.36	19	.91
5.1-10	.65	19	.81
10-15km	.75	6	.94
101-200	.21	11	.92
Total	.00	172	1.00



Graph D.4: Mean EO / Distance to the market

Annex D.10: Mean report EO / Market variety

Market variety	Mean	N	Std. Deviation
none	.03	141	1.03
1	-.07	27	.89
2	-.77	4	.36
Total	.00	172	1.00



Graph D.5: Mean EO / Market variety

Annex D.11: Crosstable FFS experience * District Musanze and Burera

			District burera		District Musanze		Total
FFS experience			0	1	0	1	
	0	Count	4	5	5	4	9
		% within District	2,7%	14,7%	3,4%	11,1%	4,9%
	1 year	Count	60	4	36	28	64
		% within District	40,5%	11,8%	24,7%	77,8%	35,2%
	2 years	Count	26	3	29	0	29
		% within District	17,6%	8,8%	19,9%	0,0%	15,9%
	3 years	Count	43	17	56	4	60
		% within District	29,1%	50,0%	38,4%	11,1%	33,0%
	4 years	Count	5	2	7	0	7
		% within District	3,4%	5,9%	4,8%	0,0%	3,8%
	5 years	Count	1	3	4	0	4
		% within District	0,7%	8,8%	2,7%	0,0%	2,2%
	less than a year	Count	8	0	8	0	8
		% within District	5,4%	0,0%	5,5%	0,0%	4,4%
	Was in FFS, not anymore	Count	1	0	1	0	1
		% within District	0,7%	0,0%	0,7%	0,0%	0,5%
	Total	Count	148	34	146	36	182
		% within District	100,0%	100,0%	100,0%	100,0%	100,0%

E. Farmer profiles

Annex E.1: Farmer profile lady living in Gicumbi

My name is , I am 26 year old married with my husband with one child from Gicumbi living in the sector Miyove.
The most important agricultural activities for me are to prepare the field well. Because it is important for the production to have a well prepared field and loose soil. At that time you provide a good seed bed and the best contact of the seeds to the soil. The second important activity is to prepare the best seed. Because good seed gives me good yields.
I obtain my farm land from our parents, they gave us a share of their land to us. Together with my husband we also bought other land to produce our crops. In total we have 15 Are. Besides my agricultural activities, we keep domestic animals, and sometimes we sell one animal and invest those money in agriculture. Besides this we can sell products we gain from the animals like the eggs from the chickens for example.
Other expenditures we have besides our agricultural activities are our medical insurance, to buy clothes and shoes. For myself the biggest expenditure is clothes.
About 2 or 3 years we would like to increase our cattle. Besides this we want to buy land to increase our production buy cultivating more land. If we finalise this we plan to build a better house than our current house.

We focus to have a good production. The time our production is very profitable, we sell a certain amount of our production, and the time we have money left we buy new land. Our focus is on growing Irish potatoes, than we rotate with Maize and Climbing beans. I focus on Potatoes because this generates money in our region. I increase my production because I use modern production techniques. I know well how to sow seed because I worked in a Cooperative called KUNDISUKA, from here i gained skills.

When I compare my production with 5 years ago I really see a big difference, because 5 years ago I prepared my field with the traditional methods. Nowadays I use modern production techniques that improve my production and the use of good inputs like quality seed, fertilizer, farmyard manure, chemicals and the right tools. To get quality seed I try to select the best seed before and store the chosen seed in the best environmental conditions. Fertilizers and chemicals, I buy them from the people I know well. We always buy inputs from the people who are allowed to sell those products. We also use our own farmyard manure, it takes some time to get the good conditions, therefor we have to store it for a long time. For our soil fertility we need the manure to keep it rich. That is why we have animals at home, because this doens't cost a lot.

Since the 30th June 2012 I am a member of IAMU(FFS). I choose to become a member because I experienced that working individually is not good to me, because when I am alone I can not gain other skills. And I think when I don't get other skills, my income does not increase. Now I gain skills and knowledge about production and I can learn from other farmers. IAMU help me to achieve many things I have now at the moment. The production is therefor triple of what I produced 5 years ago. The reason for this is that I am member of KUNDISUKA and IAMU. Currently, I am in the control comity, I evaluate the group and have the responsibility to do this myself. Sometimes it is difficult to evaluate myself but the members of the control comity encourage me, so i can do it as good as possible. In this way we try to evaluate the activities so we can make changes in the program when this is necessary. The members of the group have the same income and equal shares, so no one benefits more than one another. I think our group should invest in domestic animals. Preferably to buy for every member one animal. Besides this I think it is good to buy mattresses for each other.

To finance our agricultural activities we use the income from the previous season, we need to sell a part of our production in order to buy new inputs. When this is not enough we use money from other capital. I also have a saving account in SACCO, but I don't use credit or loans from here.

We measure our land by using Imigozi, we receive this tools from our Cooperative called KUNDISUKA. We know that when we sow 30kg of potato seed per are, we can harvest 100 kg of potatoes when the climate is not good. And 300 kg of potatoes when the climate and other conditions are goo. I measure my field ion ARE just now.

For our family it is important to find ways to have lunch and dinner. We balance our food and we also have enough food. So for now I am satisfied with our food consumption. The quality is also fine because we have only one kid, and she is still young. The good thing is that she still only eat fruits.
After harvesting we store the seed of potatoes, the other potatoes we sell in case we have enough production. We also store maize to wait for the best prices. And we also store the beans, but this is not because of good prices, but for our own consumption.

During the production process we remain the tubers underground and remove all shoot of those potatoes, this help the potatoes to gain weight and become big. But with maize and beans we put those crops in the bags to dry them well.

The big challenges we face every day is the lack of storehouses, and the lack of chemicals we used to avoid those seeds to be damaged by pests. The big problem we have is to lose the appropriate storehouse and to maize and beans we don’t have chemicals and are also too expensive.
Marketing:

To get information I am dependent on the information from our facilitator, I do not have information from other people.
When I have a lot of seeds, I sell them in preseason because in that time seed give a better price. The same to maize, we also sell in preseason and also after season, but we prefer to sell everything in preseason because late the prices can go down. When I look to the prices of previous seasons I see that the prices increased, in the high season it is not always increasing. I think the price increase because the climate change. When we have more production, a truck and car come to carry our crops that cause sometimes the high prices. This high prices is our profit. Because there is a high demand for our potatoes.

Although the prices are high it is difficult to improve my marketing, because the yields I have are low. So the quantity is not enough to further develop my marketing. All my harvested crops I sell on the village markets. I can not call other buyers outside the village because my yield is too less. I need higher yields in order to be able to call other buyers from outside.
To calculate our profits, I record all expenditures and investments. When I use money in agriculture and I try to calculate i worked in the field myself, I can make a decision after the season whether I gain money or lost.

Also external factors influence the business. Especially the climate change influence the production. Mostly the rain and sun are not balanced. Most of the time there is too much rain or too much sun. When one of them is too much we see that it damage our crops. Market prices disappoint us as well, when the yield is good we see there is also a lot of supply and because of the demand the prices are down. We do not face difficulties with government policies, we stick to our rotation crops. Also the land consolidation helps us to increase our production, because we plant on the large fields.

Annex E.2: Farmer Profile of Jean Pierre Nkiranuye, Gicumbi

Jean Pierre is 43 years and is Married. He has 2 children and lives in Kacyiru village, Mubuga cell. This is in the sector Miyove of the district Gicumbi at the Northern Province of Rwanda.
Jean Pierre Nkiranuye is an irish potato farmer with his own land of 30 are. Besides cultivating Irish potatoes he grow beans and maize. The beans and maize cultivation he use for rotational crops. Other ways to increase his production are use of insecticides and pesticides. He decide to grow Irish potatoes because the Irish potato generate a better income than other crops. The other crops are mainly for home-consumption.

Jean Pierre goes to the market to ask for the prices, he can go to different markets to sell his potatoes. Every year the prices increase because the value of Irish potatoes is increased and I get the benefits. He cannot further improve his marketing because he has not the budget for this. In order to further market his potatoes he firstly need to increase his production. But for this he has not enough land.

With the income he generates from the Potatoes he buy food that he doesn’t grow himself. Besides food, he also buy clothes from his income and the potatoes give him the ability to pay his medical insurance. The potatoes he does not sell at the market he use for own family consumption. Besides

home consumption he stores a large amount for his seeds in the storehouse for 2 months in order to get good seeds for the next season. This give him the opportunity to sustain his food security to his family and himself.

Besides his cultivation activities he also generate an income from his livestock, 1 cow and 3 sheeps. He mainly use his cow for good manure, because the cow produce a lot of manure that he can use for his production.
When Jean Pierre compare his production of 5 years ago he can see an increase of his production. Since 2012 Jean Pierre became a member of IAMU (FFS). Especially since he entered IAMU he learn the modern production techniques. This is the reason that he see that his production increase by using techniques like spacing, the use of fertilizer which the facilitator recommends them to use, and how they control the diseases in Irish potatoes. To improve his production he further learn how to use, seeds (Cruza and Sangema), fertilizers, farmyard manure, chemicals and tools. Since Jean Pierre use the inputs he see his production has increased. Still he make use of his own seeds.

Now he learnt all these techniques Jean Pierre visit other farmers to teach them the modern techniques. This is a way how other farmers can also benefit from his knowledge and skills. I receive all the information from my facilitator, I do not have contact with other persons or institutions which could help me to improve my production or business.
To improve his agricultural activities he want to buy within 2-3 years more land and more livestock.
Jean Pierre has a bank account at SACCO. He use his account to save money. Because he did not yet expand his farm he didn’t use SACCO to get a loan.
As I told you i do not have contact with other institutions. The government policy and regulation influence my business positively, because the policy do not harm my production and the production is still coming at the same time. Besides this, I am able to market my irish production easily so I think the policy of the government does not harm my production.

Annex E.3: Farmer profile of a man in Musanze

My name is , i am a man 33 years old, married and have 4 children. I live in the sector Musanze. I have 80 are and I rent another peace depending on the season. I use 40 are for growing Irish potatoes and the other part to grow other crops. I got a part from my land from my parents and the other big part I bought myself.
I produce Irish potatoes firstly, I also produce Passion fruits, transplants of Avocado, Maize, Beans and other vegetables. Besides this I keep chickens for eggs, I sell the eggs on the market. Also I focus on the transplants of Avocado, I produce and supply the transplants.

The most important agricultural activities I do is to use the best seeds that I sorted myself. Secondly to harvest on time, to wait until the crops are fully grown. To use manure. I focus on good seed because the quality seed are the security to have a good yield. Other ways are to prepare the field properly to avoid erosion and try to avoid diseases. Since the last years we know how to sell on the best price. We can see this influence on better nutrition. We also have medical insurance since we produce more.

From my income I can finance my expenditures and costs of production. Firstly I can give a salary to the people who help me in Agriculture, In general they spend much time in the Agriculture. I also use my income to buy and prepare food and ofcourse I sometimes need to buy new clothes. Another part I use to save money on the bank and I try to take care of assets I have.

About two or three years I plan to have build a developed house which I will use as a shop, and one house which is good for living in, and it should be better than the current house. I also want to expand my land by buying other land to increase my cultivated land, at least I want to buy ½ of my current land. I also do save money for my children, which I will use for their secondary school.

The inputs I use for my Irish potatoes are; Seeds, Farmyard Manure, Fertilizer, Chemicals, tools. When I do use my inputs well I can plant 600 kg of seeds, and I can harvest 5000 kg when the climate is also good. We try to focus on mixed vegetables, tubers and those crops that are good to avoid diseases. Besides this we produce some fruits. This give us a food security of about 65%. To finance my agricultural activities I use my own capital and sales from my yields. I have a saving

account at the bank and I can also ask credit from SACCO and LIMU.
After harvest, I store my potatoes. I store only seed, and also I store my maize and beans. The potatoes I lay on the ground, Because our region is cold we also store Maize and Beans. It is only to put them in the bags without using any chemicals. We face the problem that the storehouse is not good and also not big enough.
Everyday I check the potatoes which are damaged, and I take them out to avoid that they damage other potatoes. With the maize I pull out the grain on cubs without damaging them. We do not further process the crops because we do not have the skills. We first need training to do this.

When I start selling my potatoes I call people to come and pick it up. I can also go to the market myself. We find this markets in KINIGI and MUSANZE. I sell my potatoes 4 months after harvesting and to other crops in general is around 8 months after harvesting. I can call people or I can send a child that will explore the market to tell the market about my potatoes. The prices we receive are different to different markets. The Kinigi market price is not high like the Musanze. But in the season the prices are changed and we don’t see a big difference at the moment.

When I compare it with the previous years, I see an increase in the price. This is because many farmers they do not know how to use their fields in a proper way. This will profit them less, because of lower yields. The fields become too small. We see now that some people consume potatoes without producing them. Because my production increases I think I can improve my marketing, also because other people trust me, because I have good seed. I do not perceive new markets and new commercial partners.

2009, I became a member of FFS. I made that decision because I knew I can get some knowledge from others. To work with others I feel this can further develop myself. From FFS I receive advise about how I can better improve my production. Nowadays I am also an advisor myself. I help my group in give them advise and I try to look to the weak points of them and tell them how they can improve their weak points. One of my important advices is to use their property well. Everyone in the FFS group benefit the same, because they have equal shares, and they all contribute in the program. When we produce together we divide in equal proportions for their income.

The priorities of FFS should be to have a tight budget before the production start. We as a group should use our time well and to pursue to work on all activities. At least every month to have an evaluation of what we have accomplished. The perspectives of FFS are positive. Because we profit a lot from FFS, and this helps us in many things. Like gain other skills through training or through what the facilitator tell us, we want our FFS group to become a cooperative.

Before I start producing I make a budget and plan. I consider the things I might need the coming season. After harvest and selling I compare what I have invested and what I produced.
All the information we receive is from the facilitator. Besides this we also have business relations with Banks, MFI. We also have contact with Seed companies but this goes through FFS group. I got contact with the bank, because first I only had a saving account, But shortly after I started to ask loans. The loans are good, because I am able to pay back the loans and the interest is not too high. Besides the organisations i mentioned above I don’t have relations with other people.
Sometimes we face problems due to heavy rain. Heavy rain cause my production to have low yields. But when the balance between rain and sun is good, we produce more than expected. In rain season we sell our potatoes on the best price.

The government policies can give problems to my production because of land consolidation. Because of land consolidation I cannot grow the amount of potatoes I actually planned to grow. Because the government can order the people to grown other crops than potatoes. But potatoes are still needed. The government does not invite the farmers and just make decisions in their office.

Annex E.4: Farmer profile KAYOBOTSI Anastase Musanze

Farmer profile of KAYOBOTSI Anastase
KAYOBOTSI is from the district Musanze, sector, Musanze, cell; Kabazungu, village: Bihinga. I am a man, 42 years old, married and raised five children. I own 20 are and some temporary fields. On this I produce 300-400 kg per are. I focus on Irish potatoes and besides potatoes I grow Maize, Fruits and

vegetables (cabbages, amaranthus, beans etc) and I have 2 cows and 1 sheep. I focus on growing potatoes because this crop generates more income. For 5 years I am a member of FFS.
FFS is nice because it is good to work and be with others. As a group we have more power. Through FFS we have learnt how to select the quality seed and how we can store our production. We also learnt how to make manure from crops and how to spray with insecticides and use the right amount of fertilizers because the facilitator visit our fields. Throughout FFS I can teach others to improve their farm. Together with other farmers we maintain a good relation to store seeds for the market in the storehouse.

Since I started FFS I experience a growth in my income because I learnt how to improve my activities. Before I didn’t know the modern techniques. These days I know how to deal with cultural practices by cultivating on rows and spacing. I use less seed than before because of this techniques. I improved my production by using the right inputs like seeds, farmyard, ferlizers, chemicals, tools and compost. For the inputs I go to the market myself to ask for prices and the quality seed. The manure is produced from my livestock and the compost is made from dust, water and urin of the sheep.
I use my income to pay my medical insurance, school materials for the children, clothes, visit friends and I invest the earnings in buying new land. About two or three year I predict to have bought new permanently land and to pay the school fees of my child that goes to the secondary school. According the improvements of the farm it also improved the food security of my family.

My agricultural activities are financed by my own capital and I receive a loan from the association. I contribute money to the association for ones a week about 300-500 Rwandan Franc per week. The saving account is there but I do not use it to get credit but only for saving.
I harvest my potatoes for homeconsumption and the other part for the market. From this money i can buy other food that i don’t grow. I store some Potatoes for the period of 2,5 months in the store house and the other part I store for home consumption. The challenge is to store very well in order to have good quality for the following season. The time my potatoes are fully grown I go to the market to ask for prices. Every time the prices are different. At these moment the prices rise because of the rain, erosion the harvest is loss. Because the supply become less the prices increase. I have not yet any other contact persons to sell my production to. Although these hazards this potatoes generate more money than other crops. I don’t have to look for other possibilities in the market because the buyers from Kigali come to my field to get the potatoes.
Because of the government policies we find new markets and we found new jobs that generate money to buy food for our family.

Annex E.5: Man 32 years, 2ha, Burera

Burera
I am a man 32 years old married with 4 children with two hectares of land. I grow potatoes and use maize and sorghum to rotate. I also have some livestock 1 cow and 3 goats. Besides farming I have a small shop and sometimes i buy some crops to sell them again on high prices. The earnings i generate from the shop i use to generate my activities . I enherit the land from my parents and I bought another part myself. I use the land to prepare the field well to search for the best seeds to use it in the time of planting and sowing.

In the next 2 years I want to build my storehouse of potatoes which is modern, and I want to rebuild my house where my family can live. The most important expenditures of my family is to buy food and things we need every day.

The past 5 years I have increased my cultivated area to produce more in the future. I try to buy new land everytime I earn money. I try to specialise on producing quality seed, because currently i produce more seeds that give a better income when you give the good attention during the production process. I completely changed my production process in the last 5 years. I changed things within my family like medical insurance and I can receive guests since I earn money. I learnt in FFS how to change my farm. It is based on the love of farming and follow the advise from FFS. To be able to grow potatoes buy inputs from certified sellers, I use good seeds, farmyard manure, fertilizers, chemicals and tools. The result of this is that I increase my production every year a bit. Compared to 5 years ago it has positively changed completely.

I finance my production from my own capital, own saving, sales and I attract formal credit from

GOSHEN MFI and the local SACCO.

Every lunch and dinner we have food so the food security of my family is good, but sometimes i doubt whether the quality is good enough. We as family eat the same food although the kids prefer to eat fruits.

I store the potatoes in my house, I screen those potatoes on the ground every week to check whether the potatoes are damaged. When i find a damaged potato i throw it out of the store. We also store the maize in appropriate polytherme bags. We store the potatoes after harvesting until the next season starts. The objective of this system is to wait for the higher prices in the future. Storing is important to get the good prices, still we find problems in storing the potatoes in appropriate storehouses for potatoes. We do not have the skills in storing.

I don’t execute any other activities in agriculture like processing for example. What i do is to remove the shoot or outgrow of the potatoes and remain the tubers in the field. In this way the potatoes gain weight and grow. During heavy rains we have to challenge the risk of damage of these remained tubers.

After harvesting i contact my buyers. Some of the buyers are my neighbours. I sell the fresh consumption potatoes after harvesting. When it is enough to fill a truck i use a truck. I sell seed to the village markets. The price depend on the production season. Looking to the history i see every year an increase in price. I have never experienced a decrease in price. Looking to the general overview of the past i see an increase of my income. I know I make a profit because i record all my costs and benefits. At the end I evaluate to determine i finally make a profit or loss. Although i make profit i see possibilities to improve my marketing. But due to bad seeds. But I have to use credit to buy the good seeds and this cost a lot of time.

Annex E.6: woman 53 years old 2,5 ha Burera

Picture 1: The woman of the farmer profile is on the front row, the third left with the booklet.

Married woman, 53 years, four children. FFS member for 3 years.
I have 2.5 hectares. Part of the land is inherit from our parents and part of the land we bought ourselves. We use the land to grow potatoes for the best market to get the best prices. My land is increasing and I also grow other crops on our field. Besides potato we grow maize, beans and sorghum. We have 4 cows, 1 sheep, 2 goats and 2 pigs. To grow the best potatoes we think it is important to mix the right fertilizers and manure to get the good quality. Besides growing potatoes we keep animals, we have the animals to sell manure. From our animals we earn more money than from the fields. Besides selling manure we also sell other fertilizers. For our fields we use seeds, farmyard manure, fertilizers, chemicals and tools.

I am member of FFS because an association give social security and work together as a group. We share skills and receive training. I am the accountant of the group. My goal is to take care of the money of the association. I have to manage it well because i know it is important for our group. All members have their own commitment to the group. As a group i think it is important to achieve our goals and to save money on the account. The FFS group has business-relations with banks and MFI. These relation helps me to develop my farm.

The most important expenditures for our family is to pay school fees of our children and to pay our people that help us in many activities in agriculture. In the next two or three years I want to realise four goals, (1) build a high quality and large storehouse, (2) A good fence for my house, (3) keep my children in school, (4) Permission and verifying identity to multiply seeds.

During the years we see that our production changed. Five years ago it was hard to grow potatoes, but since I joined FFS I started to develop myself. I learnt how we can grow on lines and also to select the best seeds. These skills helped me to develop the farm. Because of these developments we were able to invest in domestic animals. These days all children can drink milk without problems. The income give us new goods that we don’t produce like sugar and salt, also we have learnt to live more hygienic. This all took place because the good teamwork with my husband and peace within my family. We

have learnt to achieve our goals ourselves and set up new ones like saving money. But we also still have challenges like we don’t know how to add value to our crops by for exampling processing the crops. We also have no training and therefore we cant do it.

During the production season I try to compare the production I find every season according the seeds I used. We store our potatoes, maize and beans. Our main focus is storing seed by screening them on the ground in the house. We store our maize and beans to wait for the best prices because when we immediately want to sell our crops after harvest we will not get the good prices. We face problems with storing because it is inappropriate for storing potatoes. Before getting the potatoes out of the field we cut shoot and remain tubers in the ground for causing them to become heavy and big and their skin to become hard. I sell the potatoes in the beginning of the next season in the time seeds are needed a lot. The fresh potatoes i sell immediately after harvest. Buyers come to the field to collect the potatoes. But when our production is big enough I go to the market myself.

We have a saving account and we also ask for loans and credit. I finance my agricultural activities through informal credit and sales. Looking to the result of our harvest we decide whether we made a loss or a profit. We look to this looking to the whole field and the harvest. I have a booklet with sheets to record all costs and benefits for example wages. We write down the investments in everything at the benefits and costs of the harvest and selling. With this record keeping i compare the profit from what i sell and those costs i consume I confirm a loss. But when the money I profit is much more than what i Invested I confirm a profit.

Looking to the market I see opportunities because people like the seeds we sell. We sell the seed to people from far from here. Sometimes they come to buy seeds from me because they know I have good quality seed. I do not perceive new markets or new partners. My husband is part of a private cooperation that sell and produce fertilizers.

Looking to our nutrition we think it is good because we consume food that contain all nutrients that we need to fulfil our food security. Also our children are all full grown and can eat all the food we eat.

Annex E.7: Emmanuel Kanimba, 32 years old, 0.5 ha Rubavu

Emmanuel Kanimba is 32 years and is Married. He has 2 children and lives in Nyakabungo village, Kanyefurwe cell. This is in the sector Nyakiliba of the district **Rubavu** at the Western Province of Rwanda.

Emmanuel has his own land of 0,5 ha and rent land besides this and is temporary (0,5 ha). In the beginning I only focussed on teaching but I changed my focus to agriculture because this is what I like to do and give me a good income when i do it the good way. I focus on the production of Irish potatoes and rotate the potatofield with Maize, Beans and other vegetables. I have cows, goats and chickens. Besides his agricultural activities he always try to buy other fields, livestock, clothes and he pay his own university. Because with his income I can go to the university.
About two or three years I hope I am a known seed supplier and I increased my cultivated area to increase the potato production on the field.

I become a member of FFS in 2010 (18)
my farm activities are increased when I compare this with today and before. I increased the Irish potato production. In the previous days I harvest between 500kg and today between 1.000 and 3.000 kg per harvest. (0,5 ha permanent, 0,5ha temporary). On 1 are I harvest between 100-200 kg nowadays. Since I started to participate in FFS I see a tremendous increase in production.
My increase in production is mainly due to seeds, fertilizers, farmyard manure, chemicals and other tools. I see that Cruza and Sangema have a good quality. Also the availability of farm yard manure and the because we learn the best practices from our facilitators together with an increase in prices it benefits us. I store my potatoes after harvesting the potatoes, Because I do not grow the potatoes near my home I rent temporary storehouses. Part of the seeds i store for the next season and the other part i use to sell to other farmers.

I do not have any contact persons for selling my production. The biggest part of the harvest I use for seed, and the other part I sell on the field to other buyers. Sometimes I also collect all the potatoes to

transport the production to Kigali. What I see from the past is that I benefit more than before because the value of the Irish potatoes and the increased prices. When I see there is nationally more supply because of a good harvest of surrounding farmers, the prices go down for me and the profit become less. But because I am a professional producer I see always gain a profit from the Irish Potatoes. For example I bought a cow from the profits I get from Irish Potatoes and I receive money to spend on seeds, insecticides and fertilizers. Besides this I can use my income to finance my own university. I do not focus enough on the markets, I know for example a good market exist in Monique (DRC) but because it is not accessible, due to bad security in Congo I can not go there to sell my potatoes. Besides Monique I do not have or know other Specific markets to offtake my production.

To finance my agricultural activities I firstly use my own capital and I finance my inputs from my income i receive from the sales. Besides this I also have a bank account at the local bank (Unguka bank) an d PBR (Population Bank of Rwanda). I use my bank account to save money. Besides this I receive credit from PBR, to improve my Irish potato production.

After harvesting I use my own scale to weigh my harvest of Irish potatoes, To measure the land I use a decametre to measure per are.

Because I cultivate and I receive good production, I have no problems with food security to me and my family. Also the nutrition I give to my family is very good, our diet consist Irish potatoes, maize, beans and vegetables, like carrots, cabbages and onion, besides our own produced food, we can buy our food on the local market

Annex E.8: Innocent KAMONDO, Nyamagabe

KAMONDO Innocent
I am from Nyamagabe, sector; Tare, cell; Nkumbure, Village Muhumo.
I am Innocent, 59 years old, married and raised 12 children. I am a member of FFS since last year. The most important agricultural activities on the farm is growing potatoes, wheat, tea and maize. Besides this I also grow beans and cabbages and I have some forest on my land. I have 2 hectares of land one cow two sheep and one pig. The livestock is used for manure. Just now I produce 1 ton but in 2-3 years I want to produce 1.8-2.0 or reach the ultimate goal above 2 ton. With the profit I make I wish to construct a house. My expenditures are school fees, clothes and investing in livestock.

Since I am a member of FFS I changed my production by rotating the potatoes with growing wheat, using insecticides and fertilizers (manure and chemicals), control erosion because their soil is very acid. FFS taught me how to improve my production. These days use I seed, farmyard, fertilizers, chemicals, tools and caco3. I have learnt modern cultural practices to use fertilizers, insecticides and gain more income. Throughout the training of FFS I learnt how to select good varieties and good seed quality. I follow the advice of the facilitator to decide which inputs i will buy. Looking to the past 5 years I can tell that the production is improving. My productivity depends on the amount of manure i use for the production. When i use a lot it can increase with 250-300 kgs per are.

I also store the potatoes, after harvest I store the potatoes for 3 months. The longer we store the better the price. When we want to sell immediately after harvest we experience low prices. At the moment we want to sell the potatoes we do not have any contacts of potential buyers. Immediately after harvest we sell the potatoes at the price of 120-130 frws/kg and the quality seeds prices is 300-350 frws/kg at the local market. I don’t perceive new markets or new partners. In the past years the prices are increased because the production is diseased because of the climate change. Also the prices of inputs increased. Because of an increase in risk and expensive inputs the value of potatoes rise.

I use my own capital and the income I generated from the last agricultural activities to finance my agricultural activities. I also save money on my bank account, but i do not use it to get a loan.
From the benefits of the production I gain money from the potatoes to buy food for my family. The food security of my family improved the last years because the production improves as well. I am able to grow more crops that helps me to improve the quality of nutrition of my children. I go to the market at the time I need different crops for out food consumption.

I hope that FFS further mobilise us and the production and maybe sell the production to better

markets in the future. My current relations are IAMU facilitator(FFS), agronomist of the sector and UNCOOPAGI. Also the agronomist teach us how to improve production. Because of new policies it influence our production positively. These days it is more easy to attract information about potatoes. Because my production increased it also become easier to find better markets.

Annex E.9: lady 58 years old from Nyamagabe

I am 58 years old, I am from Nyamagabe, sector Tare, Cell NKUMBURE and living in the village RUCYEREKO. I am married and have together with my man 5 children. Last year i became a member of FFS. I have a farm with 1 hectare to prepare the land of which I use 20 are for growing potatoes. I also have some livestock to produce manure. Since I am married we have land from my husband. During our marriage we try to obtain more land. After our parents past away we inherit more land. Our main and only activity is agriculture. Besides potatoes we also grow maize, wheat and tea. We have 1 cow, 1 pig and 2 goats. We think it is really important to focus on land preparation because it gives us transplants that grow well and result in high yields. We need to gain an income from agriculture in order to pay the school fees of our children, to buy food and sometimes buy clothes. Myself I like to buy soap and body lotion. At the moment we are planning to buy a cow.

At the moment we have enough land, but our land will become less when we give the land to our children. Looking to the past years 5 we see that production decreases due to the climate change it is difficult to have a constant harvest. We can only use Cruza, because this is the only variety that generate a good yield. We only use farmyard manure as input. We can finance the activities from the sales we realised last season. We do not have a bank account, savings or credit to count on.

At the moment in quantity we have enough food to fill our stomach, in quality i don’t know whether the nutrition is good. We try to buy food like fish or meat, when we have money. Our main goal is to eat a lot for satisfying our stomach.

We store our wheat, we put the wheat in bags and put those bags in the house. We sell the wheat when the prices are good. We don’t use any chemicals during storing because these chemicals are too expensive. We don’t process crops. We do cut shoot of the potatoes for causing them to gain more weight. We don’t know how to process the crops. So we cant meet any challenges. We don’t receive any training to process crops.

When we harvest our potatoes the buyers come to our home, we don’t have their contact persons for selling the potatoes, but we know that they will visit our home. We don’t exactly know the prices because the prices change every year. The prices increased a lot the past years, every year the prices increase, but they don’t come down again. I can not explain our costs and benefits, because we grow potatoes, harvest them and bring them to the market when we have enough production. Most of the time we fail to produce enough for the market. All in all, it is difficult for me to calculate the losses and benefits. I also don’t see any possibilities for us because we don’t produce enough. Therefor we also do not perceive new markets.

I am a member of FFS since 1 year, I enjoy it to be together with others. Also my neighbours stimulate me to come in FFS group to work together with them. I like to receive the training. The many advices i receive impact my production, we like to work together. Because we have the same shares everyone benefit equally in profit. For me it is important to use FFS to become the largest seed supplier, to buy domestic animals to each member of the group. Our goal of the group is to develop. But this development depends on the climate that influence our production. But I hope that our group will succeed by working together. Besides the group my own connection looking to business relation is the FFS facilitator.

F. Focus Group Discussions

Annex E.10: FGD TUZAMURANE, Burera

Focus Group discussion
Time: 9: 30 am
Interviewer: IYAKAREMYE Celestin
Notes: MUREKATETE Jeannette

This focus group discussion was taken place on the 13rd June 2013 in the FFS GROUP called TUZAMURANE, this group it is located in the district of BURERA, RUGARAMA sector and cell of CYAHI and village of TATIRO.

This group started on the 5th May 2010 this group of FFS has 20 members in the beginning, 17 females and 3 males but it remain like that until now. In the beginning they worked together with the IPM. IPM taught them the techniques and how they can use fertilizers as IPM (integrated pest management) trained this group to use:

- Fertilizers when are needed
- And chemicals in the appropriate way.

In the beginning they used hired fields but until now they bought their own fields, in every meeting they brought 50 Rwf in the days after they decided to bring 100frw as contribution which will help them to develop themselves. This increase in the saving system helped the group to invest in mobile phones. At this moment all the member have a mobile.

The goal of this group is to become an association but they want to become a cooperative, until now they work together with banks. The first bank was SACCO but now they also have loans from MFI. The total amount of the loans is around 4 million Rwf. The group also invested in a cow which is owned by the oldest woman member.

Their goals:

- To become a cooperative
- To become the most important FFS GROUP of this region.

Members:

1. NIZEYIMANA Julius (president)
2. NYIRANZIZA esther (v/c president)
3. NYIRAHABIMANA Esperance (secretary)
4. NYIRAMBONIGABA anoncee (accountant)
5. KAWERA falasie (member)
6. NYIRABUNANE dancila (member)
7. NYIRABAZUNGU Beatrice (member)
8. AYINKAMIYE madelerene (member)
9. NSABIMANA jean damascene (member)
10. NYIRANZIWABO console (member)
11. KABERA (console)
12. GASANA Emmanuel (member)
13. KAYITESI laurance (member)
14. NYIRANTEZIMANA odula (member)
15. MUKARUBAYIZA leocadie (member)
16. NYIRAHABIYAMBERE brandine (member)

Questions:

1 - How much of the potatoes you sell to the market (count the people who sell at the field and at the market

Answer: last season we harvested 9 tons of potatoes, firstly we sorted those we will use as seeds in the next season, secondly as members of group with families, we took an amount of 3 tons in our own consumption and the remaining potatoes we took to the markets. for finding more we will use in different activities in the next season.

- ***Why?***

Answer: because we want money for next season in different activities, but firstly we have to choose those we will use as the seeds in the next season.

- ***Where do you sell (why, how and when at this place)***

Answer: mainly we sell our productions on villages markets like **centre nyarwondo** and the other potatoes on the field.

- ***Do you know where other markets are***

Answer: yes, other farmers talk about the markets in Kigali, they go there sometimes, but we didn't go yet to the Kigali market.

- ***How much you use for seed potatoes***

Answer: 3 tons

- ***Why this amount***

Answer: before we do anything on our productions we select potatoes which are good and have the appropriate conditions to be selected as seeds of the next season, we select those 3 tons because the selected seed-potatoes have the appropriate condition.

3 – What varieties you produce?

Answer: **victoria, peko kinigi cruza, kuruseke**

- *try to find out why*

answer: ourselves because we produce seeds and we tried to keep them appropriately (those varieties). We know these are vigorous and perform well in this region or climate.

- *Would you prefer to maybe change to another variety*

Answer: we can change but in the time we find a new variety from RAB

The following question are about information you need for your performance on the field. Therefore we are curious to your information about the prices, fertilizers and production techniques.

4 - From whom do you receive information about prices?

Answer: for seeds we get information from RAB but to those taken to the markets, it depends to the prices which is onto the markets.

- *Name the institutions and where*

Answer: RAB

- *Do you still need extra information*

Answer: yes we need more information about prices, because prices are important in this activities. Sometimes RAB lack in providing the market prices.

5 - From whom do you receive information about fertilizers?

Answer: in the beginning it was the IPM and the FFS facilitator who gave us information about fertilizers, until now we use what we have learnt before and no other information at the moment.

- *Name the institutions and where?*

Answer: we can say IPM from RAB and the FFS facilitator.

- *Do you still need extra information?*

Answer: yes, we need extra information.

6 - From whom do you receive information about production techniques?

Answer: it was IPM and FFS through facilitator.

- *Do you still need extra information?*

Answer: yes, we need other information about techniques because every day the climate changes. For this reason we need improved techniques.

7 – Who of you buy seeds from large seed suppliers(count)?

Answer: we use our own selection and sometimes we buy seeds of other FFS GROUP. Our group know well how to produce the best seeds.

- *Why (not)?*

Answer: because there is no large suppliers who are near here.

8- Who of you like to lead a group ?

Answer: in our association, in the time to choose a leader we have an election, but especially we choose (Julius) because he is a native in this region. He comes from a region where they grow many potatoes. Julius is trained to grow potatoes, and has more potential compared to the rest of the group. That is why we choose him as the leader of the group.

- *Why*

Answer: Our leader has more potentials.

9- When you would receive a higher price with washing or packaging, would you wash or package the potatoes?

10 – Why do you rotate with other crops?

Answer: as we learnt from IPM and FFS facilitator diseases are different among crops, when we harvest potatoes we plant common beans, because beans will not attacked by diseases of potatoes, those beans will grow well without any problems and reduce the vigilances of diseases concerned to potatoes in the soil. And also when you use cereals in rotation, they accumulate nitrogen in the soil which will be needed by the potatoes in the next season.

- some examples of rotational crops?

Answer: common beans, maize.

- Do you collectively act on the market?

- When no? Why don't you,,what is the reason?

Answer: we are not yet get on that level but it is our mission to collectively to the market in the near future.

- When do you harvest your potatoes ?

Answer: when the potato is fully grown

- another reason

Answer: our mainly purpose is to produce seeds, and seeds are selected to potatoes which are fully grown.

- With which institutions do you directly cooperate. And with whom would you like to cooperate more?

Answer: URUGAGA, IMBARAGA and IPM (SPAT II)

- Do you think you will get more income when you go to the markets yourself?

Answer: yes, when we will find more production we will go to markets ourselves as we did it before.

- Would you like to go the markets yourself?

Answer: yes, because you get more income when you go to markets yourself. At these markets you can find competition between prices.

- How far is the market from your production?

Answer: to Kigali distance is 102 km and in villages market is 2 km

- Who of you check if the potatoes correspondent with what the buyers want?

- why yes or no?

- Who of you goes to the market to find out what the customers want in the next season?

How do you check? (asking traders, RAB, customers)

- Who of you check the best market/customer to sell the potatoes?

Answer: accountant.

- do you share this information in the group?

Answer: before any decision start to be used, whole group sit together and share all information.

- **Who of see opportunities and also realise the opportunity?**

Answer: is the president

- Why you don’t realise the opportunity and why you do or don’t see opportunities?

Answer: but to find opportunities is difficulty in this time, we need advocacy from you (visitors)

- Who of you can easy access credit for the next season to buy for example seeds ?

Answer: as the association **president, accountant and secretary are in charge.**

- what are common problems of the credit/financial institutions ?

Answer: It is the guarantee and when you are not a cooperative, to ask loans become more difficult

- Who of you focus on cost reduction? And how do you try to reduce costs.?

Answer: here we make decision together and when we find we have to reduce costs, together we choose one day in the week to come to do some activities ourselves.

- Who of you focus on harvest increase? And why or why not?

Answer: as association we work together in terms to find what can increase in our production.

- Are you interested to go to the market? For example by working together with other groups?

Answer: to work together is good but when you become a lot of people communication become complicated and some people refuse to work with others because they think that other members are there to work that is why we decide to remain like this a group of 20 members for making communication easy.

Annex E.11: FGD KUNDUMURIMO Burera

Focus Group discussion
Time: 8 : 45 am
Interviewer: IYAKAREMYE Celestin
Notes: MUREKATETE Jeannette

Introduction

This focus group discussion was taken place to 14th June 3013 with FFS group called KUNDUMURIMO. Before we went on the sector office to ask allowance and permission to go to visit that FFS group called KUNDUMURIMO, executive secretary received us kindly with pleasure.

FFS GROUP KUNDUMURIMO members are 22, 6 female and 14 male. this group begun on the

5/10/2012 in the beginning their main crops were potatoes and maize. Trainer and facilitator taught them in the beginning to spray chemicals and how they can plant on lines to use fertilizers. In the beginning they used a hired field. KIRUNDO was their first variety grow with them and in that time they failed but they continued to work together to see how they can cover that loss they faced in the first time they continued with PEKO variety, this variety gave to them a good yield and gained more income.

They meet once in a week, every Monday and try to bring at least 100 frw as a contribution, because every Monday they do that action money become more. With this is saving system they bought domestic animals for all members of the group.

Their goals:

1. to produce 2 tons of seeds every season.
2. To sell on the markets at least 5 tons of potatoes.
3. They want to build their own storehouse of seeds which is modern.
4. Just now we are an association but we want to become a cooperative in the near future.
5. We want to expand our land to grow more potatoes.

Members of FFS GROUP KUNDUMURIMO:

1. BASABOSE joseph (president).
2. NYIRANZOGA Jacqueline (v/c president)
3. IYAMUMPAYE joseph (secretary).
4. NZABANITA jeremie (treasurer).
5. GASIGWA damascene (president of control comity)
6. BIMENYIMANA valens (member)
7. NIYONZIMA jean damascene (member)
8. NTIRENGANYA dolote (member)
9. MUJANAMA elise (member).
10. NTAWERA Celestin (member)
11. UGWAGESHE jean de Dieu (member)
12. MUKAMUTANA Elizabeth (member)
13. MUNYAZIRINDA damier (member)
14. NDACYAYISABA noel (member)
15. RUSENGO damascene (member)
16. NSHIMIYIMANA
17. NTUYEMUBEZA naphutal (member)
18. RWAJEKARE
19. MBARUSHIMANA solange (member)
20. SIBOMANA simon (member)
21. NYABANGANYIMANA
22. NDIMURWAYO.

Questions:

1 - How much of the potatoes you sell to the market (count the people who sell at the field and at the market

Answer: in last season we harvested 6 tons of potatoes and we sold on markets 3 tons.

- ***Why?***

Answer: because we want money for the next season in different activities, to pay workers who will help us. We do not have other resources that is the way we have to sell some amount potatoes but before selling we take whole productions and select first those we will store as seeds for the next season. The potatoes that remain are taken to the markets.

- ***Where do you sell (why, how and when at this place)***

Answer: seeds are sold to people who want seeds and sometimes RAB come to buy our seeds and give them to other farmers. But fresh potatoes are taken to the markets, sometimes when we have a lot of potatoes which can fill a truck we take potatoes ourselves to Kigali market, and in the time there are not enough, we buy potatoes from other farmers until a truck is full and can take it to the Kigali market. Sometimes we also sell the potatoes to villages markets.

- ***Do you know where other markets are?***

Answer: yes we know, like kimironko market, nyabugogo market.

- ***How much you use for seed potatoes***

Answer: 2 tons

- ***Why this amount?***

Answer: we select the best ones that have the medium size and also which have the appropriate

conditions concerned to the best seeds.

3 – What varieties you produce

Answer: only PEKO

- *try to find out why*

Answer: PEKO variety give higher yields and perform well in this region and we produce this variety ourselves. We do not buy the seed on the market, means we know well the strength of this variety.

- *Would you prefer to maybe change to another variety*

Answer: we plan to buy other variety called KIRUNDO from RAB, when RAB announced it will realise it.

The following question are about information you need for your performance on the field. Therefore we are curious to your information about the prices, fertilizers and production techniques.

4 - From whom do you receive information about prices

Answer: before selling we phone and we ask some people from Kigali to tell us the prices of the markets, and as institution ministry of commerce provide how you can send SMS using your telephone mobile asking how the prices of a certain crops are on different markets. Immediately you receive other SMS reply according to what you ask. But for seeds we sell according to prices which is on the markets. But when RAB want to buy the seed, it offers you the prices that is higher than on the village markets.

- *Name the institutions and where?*

Answer: at least we can say ministry of commerce and RAB

- *Why those?*

Answer: because are those which try to intervene

- *Do you still need extra information*

Answer: yes, as always technology increase every days, we want to find other techniques, how we can find other techniques which is easy.

5 - From whom do you receive information about fertilizers

Answer: in the beginning of our FFS GROUP we were trained about how to use fertilisers through IPM. But is only RAB that fix the prices of fertilizers of the whole country.

- *Name the institutions and where*

Answer: we were trained through IPM from RAB.

- *Do you still need extra information*

Answer: because fertilizers are important thing in our activity of grow potatoes we need more information about it and other improved training.

6 - From whom do you receive information about production techniques

Answer: IPM trained us about techniques from RAB.

- *Name the institutions and where*

Answer: we can RAB through IPM

- *Do you still need extra information*

Answer: yes, we want other information about techniques.

7 – Who of you buy seeds from large seed suppliers(count)

Answer: sometimes as a group we can buy seeds from SNS and other cooperative called COAMV

- *Why (not)*
- *From whom?*

Answer: from SNS and COAMV.

8- Who of you like to lead a group?

Answer: as association for choosing who is going to lead our association we make election and choose that based on the criteria group members discuss together.

9- When you would receive a higher price with washing packaging, would you wash or package the potatoes?

Answer: In a FFS group

10 – Why do you rotate with other crops?

Answer: we rotate with cereals because those cereals accumulate some elements in the soil like **nitrogen** which is needed by potatoes a lot. And as we know the diseases are totally different in different crops. The diseases of potatoes are not the diseases of the maize or common beans, those crops like maize and beans reduce the diseases of potatoes in the soil.

- *some examples of rotational crops*

Answer: maize, common beans and wheat.

- Do you collectively act on the market.

Answer: yes, because in the association we have a man who is in charge of knowing how markets are

given time.

- How

Answer: sometimes when we have a lot potatoes which can fill a truck we take potatoes ourselves to Kigali market, and in the time are not enough we buy other from other farmers until a truck is full and take it to the Kigali market, all this activities that man who is in charge act collectively on markets.

- Where ?

Answer: in different markets in this country.

- When do you harvest your potatoes,

Answer: when the potato is fully grown

Reasons: their main purpose is to produce seeds and best seeds come from those potatoes which are fully grown.

- With which institutions do you directly cooperate. And with whom would you like to cooperate more?

Answer: RAB but it is not in a good way because we take negotiation, we wish to fill free in RAB ask and say whatever we want.

We want to cooperate more with RAB and MINAGRI and with other $NGO_{S,}$ URUGAGA IMBARAGA.

- Do you think you will get more income when you go to the markets yourself?

Answer: yes indeed because on big markets or to go there yourselves you find a competition where you can negotiate on the prices.

- How far is the market from your production

Answer: to Kigali markets is 106 km and in villages markets is 2 km

- Who of you check if the potatoes correspondent with what the buyers want?

Answer: is that one who is in charge of find markets and know more about prices. But it is not easy o produce potatoes which is enough to those buyers want.

- do you share this information in the group

Answer: yes we share information through telephone mobile because every members has a mobile.

- Who of you can easy access credit for the next season to buy for example seeds?

Answer: as a associations we never ask loans until now but we plan it in the future.

- what are common problems of the credit/financial institutions

Common problems is this we are not a cooperative to find loans in that you are not yet a cooperative is a problems.

- Who of you focus on cost reduction? And how do you try to reduce costs.

Answer: in preseason we prepare all our things and we try to compare money we have if we find we have less, we decide to reduce activities, and other which require physicals forces we decide to do that with our hands.

-Who of you go to credit/financial institutions to get a loan or credit for your inputs? And which credit institutions you go to?

- Who of you focus on harvest increase? And why or why not?

- Who of you try to change the production process? Why

- Are you interested to go to the market? For example by working together with other groups? / Would you be willing to go to the market when the prices increase

Would you be willing to go to the market when you receive better transport possibilities.

Annex E.12: FGD Tuzamurane Gicumbi

Focus group discussion
Time: 10 am
Interview: IYAKAREMYE Celestin
Notes: MUREKATETE Jeannette

Introduction

This focus group discussion was taken place to 20th June 3013 with FFS group called TUZAMURANE. Before we went on the sector office to ask allowance and permission to go to visit that FFS group called TUZAMURANE, that sector is MIYOVE accountant received us kindly with pleasure.

The FFS GROUP TUZAMURANE was started on the 8th March 2012 in the beginning people who help us, gave us some help of 96kgs of seeds potatoes, fertilizers 10kgs our field was bigger because

that seeds were not enough that is the way we bought other in that time to add to those people gave us, in the end of the season we harvested around 200kgs of potatoes. After sell that productions all were kept and for buying seeds of the next season we used money from our resources and our facilitator in that time he/she lent our group money And lent again tools for spraying chemicals. We bought beans and every member of a group take some amount which will paid back late with little amount interest.

Goals:

- We want to buy medical insurances to every member of a group.
- We want to buy domestic animals to every member of a group.

Members:

1. MUKANGARINDA gaudance (president)
2. BUHIGIRO (v/c president)
3. MUKANKERA Chantal (secretary)
4. DUSINGIZIMANA donate (accountant)
5. MUSABYIYAREMYE belenire (control comity)
6. MUSABYIMANA
7. NYIRANTACYOBITWAYE dorolosera (member)
8. MURAGIJIMANA Agnes(member)
9. SAGAHUTU Celestin (member)
10. KABENGO Celestin (member)
11. NYIRAMPAKANIYE saveline (member)
12. TWAHIRWA martin (member)
13. BAMVUGANUMVA dolosera (member)
14. BIGARAME
15. MUCYESHIMANA
16. MUKAKARISA susan (member)
17. MUREKATETE vestine (member)
18. NGIRUMPATSE Boniface (member)
19. MUKANDAHIRO gaudance (member)
20. UWIMANA julienne (member)
21. MURAGIJIMANA alphonsine (member)

Questions:

1 - How much of the potatoes you sell to the market

Answer: last season because went bad all production were sold on the markets. Those production were 200kgs

- ***Why?***

Answer: because heavy rain damage those potatoes, we decided to sell all those 200kgs without store seeds and were not enough that was the way we sold all production. There were no amount consumed by the members.

- ***Where do you sell (why, how and when at this place)***

Answer: we don't go far away from here, we sell our production on our village market.

  - ***Do you know where other markets are***

Answer: yes, we know where other markets are like GICUMBI market and we have access to go there but our production limit us. We s about never went there and other markets are KIGALI markets but is to understand there news about them only.

- ***How much you use for seed potatoes***

Answer: last season we didn't store seeds of potatoes because all production were damaged by heavy rain. To store seeds from potatoes which were damaged or which are not good can cause to lose the production of the next season. Seeds are sorted to potatoes which were grow well and which are not too big and have a good size.

  - ***Why this amounts***
  - ***Why not more or less?***

3 – What varieties you produce?

Answer: **rwangome and sangema.**

- *try to find out why*

answer: because **rwangome** grow quickly. Rwangome and sangema are comfortable with the soil of this region. Rwangome ang sangema buyers like them. Even seeds and potatoes to eat.

- *Why this variety*
- *Would you prefer to maybe change to another variety?*

Answer: we decide to change the varieties when the previous one become exhausted. At least every two years if possible we must change the varieties.

The following question are about information you need for your performance on the field. Therefore we are curious to your information about the prices, fertilizers and production techniques.

4 - From whom do you receive information about prices?

Answer: before selling our potatoes we refer ourselves to markets how the prices are. No other institution which interfere in fixing prices or give advice.

- *Do you still need extra information*

Answer: yes, we need extra information but also the important things is if possible to provide for us the market when the production is enough and to find the competitive.

5 - From whom do you receive information about fertilizers?

Answer: The knowledge we used about fertilizers, were those we learnt to our facilitator in the beginning. No other institution which help us.

- *Do you still need extra information*

Answer: we need other information and other skills but other a lot if possible is training and field visit to other who are developed.

6 - From whom do you receive information about production techniques

Answer: we refer to those facilitator only because they are know well to grow potatoes.

- *Do you still need extra information*

Answer: yes, if find people who can teach us other techniques will better.

7- who of you seeds from large seed suppliers?

Answer: we are still in the beginning, we still use the seeds from potatoes grow those given to us in the beginning by the RAB.

8 – Why do you rotate with other crops

Answer: we rotate when we want to reduce diseases of potatoes in the soil. And cause the soil to rebuild itself because the crops like cereals help the soil to accumulate other elements.

- some examples of rotational crops

Answer: **maize and beans.**

- And try to understand why they make certain decisions

Answer: we choose the crops which are comfortable with the soil.

- Do you collectively act on the market?

Answer: no because we are still in the beginning, our production are not enough.

- How

- Why (not)

- Where

- When no? Why don’t you, what is the reason?

- When do you harvest your potatoes,

Answer: or when the potato is fully grown. But when there is heavy rain in the time the potatoes are on the mature stage but not yet fully grown we harvest them for avoiding to lose whole productions.

- With which institutions do you directly cooperate. And with whom would you like to cooperate more?

- Why not?

- Do you think you will get more income when you go to the markets yourself?

Answer: because we are still in the beginning in the near future we plan to sell our production on the big markets but this will depends on how climate will be.

- Would you like to go the markets yourself

Answer: yes, but we are not yet at that stage.

- How far is the market from your production

Answer: the nearest market from to our field is in 4 km

- Why you don’t realise the opportunity and why you do or don’t see opportunities.

- Who of you can easy access credit for the next season to buy for example seeds

Answer: yes, we have saving account in SACCO. But we are not yet ask loans.

- what are common problems of the credit/financial institutions

- Who of you focus on cost reduction? And how do you try to reduce costs.

Answer: every members is in charge of those activities. to reduce cost we decided to do all physical activities ourselves for avoiding to spend more money.

6. When all your questions have been asked, and before the group discussion ends, ask if anyone has any other comments to make

Annex E.13: FGD DUHINDURE IMIKORERE, Gicumbi

Focus Group discussion
Time: 10 am
Interview: IYAKAREMYE Celestin
Notes: MUREKATETE Jeannette

Introduction

This focus group discussion was take place on 20th June 2013 with FFS group called DUHINDURE IMIKORERE. Before we went on the sector office to ask allowance and permission to go to visit that FFS group called DUHINDURE IMIKORERE, that sector is called MIYOVE sector, executive secretary received us kindly with pleasure.

The FFS GROUP is called DUHINDURE IMIKORERE the members of this group are 15 members with male and female this group was begin on the 2nd June 2010 in the beginning we were 30 members under the help of RADA just now it becomes RAB in that time they gave to us the important tools to use which were the tools to spray chemicals in the potatoes and seeds were 126kgs of potatoes and were planted on the 6 are. They gave us also the fertilizers and chemicals and also they provided money for us to hire the fields, manure fertilizers were from resources those people from RADA taught us the modern techniques we can use in our planting. In the first season we harvested around 1 tons and 700kgs we started to develop ourselves in that ways and we started to do some actions between us. We bought mattress for each members those mattress each was cost 18000frw.

the goals of the group in:

- We want to become the large breeders and to become the suppliers of the best suppliers
- We want to become a cooperative in the near future.

Needs:

- We want more trainings and field visit.
- We want a markets of our production because in the time we get more production we face the problems of the markets which are limited and no competitions.

Members:

1. KABANDA Augustin (president)
2. MUKASHEMA console (v/c president)
3. SAKINDI Gerard (secretary)
4. MUTABAZI felicien (president of the control comity)
5. BAVAKURE jean baptiste (treasurer)
6. DUSHIMANA Emmanuel (in control comity)
7. TUYISHIMIRE desire (control comity)
8. HABINEZA froduard (adviser)
9. DUFITAMAHORO Damien (member)
10. NDEBWENBANDE merry (member)
11. NDIZIHIWE gratien (member)
12. AHISHAKIYE clemantine (member)
13. MUKANZIRA illumine (member)
14. NGENDAHIMANA Dominique (member)
15. SAMVURA jean claude (member)

Questions:

1 - How much of the potatoes you sell to the market

Answer: last season we harvested the 600kgs of the potatoes and all those potatoes were taken to the markets

- ***Whys***

Answer: Because the rains in this season Damage the potatoes.

- ***Where do you sell (why, how and when at this place)***

Answer: we sell our production on the villages markets to the people sometimes who want to prepare their food. And also to the people who bring bicycle.

- ***Do you know where other markets are***

Answer: ourselves we sell our production on the villages markets other markets is to understand to those people who go there sometimes when their talking about those news about other markets. Ourselves we are not yet go there, to other markets.

- ***How much you use for seed potatoes***

Answer: in last season we did not store even 1kgs of the seeds potatoes

- ***Why this amount***

Answer: we did not store seeds of the potatoes because the rains damage all production of our potatoes, you can’t store seeds from those potatoes which are not good, the time you use those seeds you can’t harvest anything in the next season.

3 – What varieties you produce

Answer: **cruza this is from RAB, sangema, rwangome, nyirakabondo, and mabondo.**

- *Why this variety*

Answer: to those varieties especially cruza, rwangome, and sangema when we practice the techniques we learnt from IAMU especially to our facilitator and also climate stay good we harvest the best yields. Other reason cruza and rwangome buyers like them even seeds or those which are fresh for preparing foods.

- *Would you prefer to maybe change to another variety*

Answer: in general when you grow one variety in two years, you must change it, because in two years variety become exhausted not again to give a good yields like before.

The following question are about information you need for your performance on the field. Therefore we are curious to your information about the prices, fertilizers and production techniques.

4 - From whom do you receive information about prices

Answer: there are no institutions which help us to get prices.

Every seasons the prices are different. The time to go to the markets, we go on the markets to ask and investigate how the prices are on the markets only. Some of our members are neighbours of the markets to know the prices which are on the markets are not difficult. And also before selling we ask the prices which is on the markets of GICUMBI. After that we sit together as a group and make decisions of what we are going to do.

- *Do you still need extra information*

Answer: yes and we want other skills of how we can know information in the easy ways.

5 - From whom do you receive information about fertilizers

Answer: there is no other institution we cooperate with it about fertilizers, is only facilitator from IAMU and agronomist of sector. Sometimes leadership of our cell come to visit our fields and give advice only.

- *Why those*

Answer: because are those only who are found and who want to help us. And also ourselves we don’t have the ability of going to check or find high institutions we can cooperate with it ourselves.

- *Do you still need extra information*

Answer: yes.

6 - From whom do you receive information about production techniques

Answer: There is no other institution we cooperate with it about techniques.

Answer: until now the techniques we use in our fields are those we learnt in the beginning through IPM from RADA.

- *Do you still need extra information*

Answer: yes, we need other extra information about techniques because to us we fill as the climate change every years, also we need new techniques or improve those you had before.

8 – Why do you rotate with other crops

Answer: we rotate potatoes for avoiding soil to be exhausted and reduce the vigorous of diseases of potatoes because as the crops are different and their diseases are also different. Some crops accumulate some elements in the soil which are needed by other crops.

- some examples of rotational crops

Answer: **maize, climbing beans and wheat.**

- And try to understand why they make certain decisions

Answer: before choose the crops used in rotation we have to see if the crops are compatible with the soil. And also in rotation we use the crops which give the higher yield.

- Do you collectively act on the market.

- How

- Why (not)

- Where

- When no? Why don’t you, what is the reason?

- When do you harvest your potatoes,

Answer: when the potato is fully grown

- another reason

Answer: the main reason for harvesting the potatoes when are fully grown is seeds. Because seeds taken to potatoes which are fully grown give higher yields when are planted.

- With which institutions do you directly cooperate. And with whom would you like to cooperate more?
Answer: there is no institution we cooperate. We don't know those institution which are related with agriculture even private or public.
- Why not?
- Do you think you will get more income when you go to the markets yourself?
Answer: yes, because when you go to markets yourself you find the best prices.
- Would you like to go the markets yourself
Answer: yes
- How far is the market from your production
Answer: the village market we can to sell our production is in 4 km from our fields.
- Who of you check if the potatoes correspondent with what the buyers want?
Answer: we are not on the stage where you can call people to come to see our production because our production is not enough.
- why yes or no?
- Who of you goes to the market to find out what the customers want in the next season? How do you check? (asking traders, Rab, customers)
- Who of you check the best market/customer to sell the potatoes
- Why, or not
- **Who of see opportunities and also realise the opportunity?**
- Why you don't realise the opportunity and why you do or don't see opportunities.
- Who of you can easy access credit for the next season to buy for example seeds
Answer: no one who is in charge but we have account in SACCO we are not at that stage but because we want to do our agriculture professional we plan to ask for loans.
- what are common problems of the credit/financial institutions?
Answer: as our group because we are not yet cooperative to ask loans is a big problems.
- Who of you focus on cost reduction? And how do you try to reduce costs.
Answer: no one of our group who is in charge of cost reduction but as a group we work together. Before start of planting in preseason we make plan of what we will need in whole season and when we found are too much we decide to do some activities ourselves. And to avoid to take out money from our account we decide sometimes to use money from in our own things not from group account. And like manure instead of buy it we decide to bring a given amount of it in our home without use money from group account.
-Who of you go to credit/financial institutions to get a loan or credit for your inputs? And which credit institutions you go to?
- Who of you focus on harvest increase? And why or why not?
- Who of you try to change the production process? why
6. When all your questions have been asked, and before the group discussion ends, ask if anyone has any other comments to make
7. don't forget to thank the group for coming

Annex E.14: FGD Rubavu

Focus group discussion
Time: 9:30
Interview: IYAKAREMYE Celestin
Notes: MUREKATETE Jeannette

Introduction
We started on the 12th /08 /2010 in our beginning we were planted tomatoes after that season we found the tomatoes were not comfortable with the soil of our field. We decide to plant potatoes. In starting IPM was help us to find seeds they gave us different varieties including **cruza; gikungu; mabondo; sangema; kirundo** those varieties were weight 120kgs. They gave us also 50kgs of fertilizers. Our first production was 1500kgs of potatoes. Some varieties faced with diseases and others become exhausted, we tried to hire other land and we planted carrots. We meet once in month and in every week we do different activities twice in week. Association bought a goats to every members which has the value of 2000frw per each.
Goals:
1. We want to become cooperative
2. We want to become a large suppliers of the best seeds
3. We want to produce more seeds than fresh potatoes because seeds brings more money than

fresh potatoes.

Members:

1. HASHAKIMANA jean claude (president)
2. KAYITESI josiane (v/c president)
3. HABANABAKIZE (accountant)
4. NTIRENGANYA Olivier (secretary)
5. NIKUZE godance (member)
6. NYIRAMUGWERA godance (control comity)
7. MUKESHIMANA (member)
8. RUKARA (member)
9. GUMYUZANE Chantal (member)
10. HABANABAKIZE Frederic (member)
11. NIREMBERE vestine (member)
12. TWAGIRAYEZU (member)
13. BIMENYIMANA (member)
14. NGIZWENAYO (member)
15. UWAMAHORO (member)
16. UWAMAHORO (member)
17. SEHENE jonathan (member)
18. NTIBASEKUYE (member)

Questions:

1 - How much of the potatoes you sell to the market

Answer: last season we produced 2 tons and we sold 1tons

- ***Why***

Answer: because we don't have the storehouse to store those potatoes and we want money for buying the new land and to find some we will invest in the production of vegetables.

- ***Where do you sell (why, how and when at this place)***

Answer: **how?** We don't have market, they are people who carry those potatoes on the head and take it to the market.

- ***Do you know where other markets are***

Answer: there are so many markets but ourselves we never went on the markets it is only to understand information about those markets.

- ***How much you use for seed potatoes***

Answer: in the 2 tons we produced we tried to store 400kgs of the potatoes.

- ***Why this amount***

Answer: because that amount is equal to field we have, but firstly we choose seeds based on the appropriate condition which characterised good seeds as our facilitators taught us.

3 – What varieties you produce

Answer: **mabondo; rwasake; sangema.**

- *try to find out why*

Answer: sometimes it depends on the prices seeds are sold on the markets and especially we plant **mabondo** because we know it perform well .and give high yield in our land and also in this region.

- *Would you prefer to maybe change to another variety*

Answer: when we will find money for investment we will try to produce all those varieties IPM gave us in the beginning, even **mabonbo** perform well than others, also others give high yields the problems we don't have the storehouse to store all those varieties.

The following question are about information you need for your performance on the field. Therefore we are curious to your information about the prices, fertilizers and production techniques.

4 - From whom do you receive information about prices?

Answer: no other institution accountant and control comity go on market to investigate how prices are on the market, how others sellers sell their production. And agronomist help to know how the prices are on t help to know how the prices are on the markets because he meets with so many different peoples.

- *Do you still need extra information*

Answer: yes we need other information because we spend so much time in investigations of prices.

5 - From whom do you receive information about fertilizers?

Answer: there is a policy established by MINAGRI in sector where they give us fertilizers on the half

of money fertilizers sold in normal.

- *Name the institutions and where*

Answer: is the only agronomist who help us to know how we can mix different proportion of fertilizers and manure. Also some people who do research and who try fertilizers come in our fields to do those activities and some time we gain some knowledge to them.

- *Do you still need extra information*

Answer: if possible to find trainings and field visit, it will be better to improve our knowledge on the fertilizers.

6 - From whom do you receive information about production techniques?

Answer: is the facilitator who taught us to some techniques, how we have to plant on the lines with good measurement between lines and between plants.

- *Do you still need extra information*

Answer: yes

Who of you buy seeds from large seeds suppliers?

- *Why?*

Answer: because he knows well to select best seeds and those seeds we brought from him, give us higher yields.

- *From whom?*

Answer: individual person who has allowance from RAB.

8 – Why do you rotate with other crops?

Answer: In our group it is not allowed to grow same crops in successive season; to rotate to us we find it is increases our production; rotations help us to decreases diseases of crops because the disease of the potatoes is different tto disease of the beans or others crops.

- some examples of rotational crops

Answer: **maize; climbing beans; vegetables.**

- Do you collectively act on the market.

- How

- Why (not)

- Whereve

- When no? Why don’t you, what is the reason?

- When do you harvest your potatoes?

Answer: when the potatoes are fully grown

- another reason

Answer: we harvest potatoes when are fully grown because our main purpose is to produce seeds. And when potatoes are fully grown give higher income because are too heavy and buyers like them.

- With which institutions do you directly cooperate. And with whom would you like to cooperate more?

Answer: URUGAGA IMBARAGA.

Urugaga imbaraga give us trainings; they teach us to cooperate with banks; they teach us to know to calculate the loss and the profit.

- Do you think you will get more income when you go to the markets yourself?

Answer: yes the problems, we produce a less production which an not permit us to go to markets ourselves and also we don’t have a good road which can help us to use a truck.

- Would you like to go the markets yourself?

Answer: yes

- How far is the market from your production?

Answer: our nearest market is the 9km.

- Who of you check if the potatoes correspondent with what the buyers want?

Answer: we can’t do this to see if the production is correspondent to the buyers because we know, we produce a less production. And also there is no time where potatoes can be a lot more than the buyers.

- Who of you goes to the market to find out what the customers want in the next season?

Answer: we observe this according how the previous seasons the production were produced. When the production were bad here we confirm in the next season the potatoes will be needed in bigger amount.

- Who of you check the best market/customer to sell the potatoes

- Why, or not

- **Who of see opportunities and also realise the opportunity?**

Answer: no one, but when the opportunity is found the comity deal with it.

- Why you don’t realise the opportunity and why you do or don’t see opportunities.

- Who of you can easy access credit for the next season to buy for example seeds
We have a loans of million (1000000frw) but there is no particular person who is charge, is the all comity which deal with asking loan.

- What are common problems of the credit/financial institutions?

Answer: interest rate on loans is very high; the process of asking loans take long time sometimes this cause bigger loss, because you can ask loans in the preseason and bank gave that loans to in the out season.

- Who of you focus on cost reduction? And how do you try to reduce costs.
Answer: no particular person, we take decision together. Some activities we do ourselves, we prepare land ourselves; we bring manure ourselves.

-Who of you go to credit/financial institutions to get a loan or credit for your inputs? And which credit institutions you go to?

- Who of you focus on harvest increase? And why or why not?

- Who of you try to change the production process? Why?

Answer: we sell our production as we harvest it no other change we make to those potatoes. The big [problems here we don't have the storehouse; and our production are not enough.

6. When all your questions have been asked, and before the group discussion ends, ask if anyone has any other comments to make
7. don't forget to thank the group for coming

Annex E.15 FGD Nyamagabe

Focus group discussion
Time: 9:30
Interview: IYAKAREMYE Celestin
Notes: MUREKATETE Jeannette

Introduction:
The 3rd 07 2013
District: NYAMAGABE
Sector: IWINKINGI
Cell: MUNYEGE
We started our group on the 16th May 2010 in the beginning they gave us the 6 different varieties of seeds. We tried to contribute the shares of 500frw per each member. We bought piglet and medical insurance to each member of the group. We have a saving account and to that account, we have 29500few and other around 316000frw which are distributed in the members as loans but we don't have a loans from bank. Where we plant or sow our different crops are the hired fields and just now we have potatoes in the field of 35are. As the members of the group we meet two times per week in the different activities of growing our crops and we meet once in month as a general assembly.

Names of the members:

1. RUBAYIZA innocent (president)
2. MUKAMUSONI anastasie (v/c president)
3. RUKUNDO Celestin (secretary)
4. MBARUBUKEYE felicier (president of the control comity)
5. NYIRABAGABE frolide (member)
6. SINDIKUBWABO jean bosco (treasurer)
7. KARURENZI therese (member)
8. HABANABASHAKA Emm anuel (member)
9. NTAKIYIMANA francois (member)
10. MUKARUKUNDO marie Claire (member)
11. NYIRAHATEGEKIMANA therese (member)
12. NYIRANSABOMANA clarisse (member)
13. HABIMANA greguar (member)
14. MITEGEKA agnes (control comity)
15. RUSHEMA faustin (advisor)
16. HATEGEKIMANA marie (member)
17. NYIRAKAMONDO josepha (member)
18. HAKUZIMANA gaspal (member)
19. MUSHIMIYIMANA Helena (member)
20. MUKASHEMA margarte (member)
21. UWIMANA Jeannette (member)
22. KAMANA Laurent (member)

23. INGABIRE (member)
24. NYIRANGENEYE Viviane (member)
25. NYIRAMINANI venancie (member)
26. NYIRAKAMANA Esperance (member)
27. MUKAMUVARA Eugenie (member)
28. MUKANYARWAYA marena (member)
29. MUKANSANGA alphonsine (member)
30. NYIRABUTARANGURWA Jacqueline (member)
31. NZARUBARA jean marie vianney (member)

Questions:

1 - How much of the potatoes you sell to the market

Answer: we planted 200kgs of potatoes seeds on the land of 15are and we harvested only 500kgs of whole production we used all that production in consumption because all potatoes were diseased, we didn't store seeds to those potatoes.

- ***Why***

Answer: because

- ***Where do you sell (why, how and when at this place)***

Answer: **where? :** GASARENDA market. **Why:** for finding other money we will use in the next season and sometimes we want things we want to buy like in the time we want to buy a medical insurance. Particular the potatoes which are too big must sold on the market because we don't have the way to store them we store potatoes which have a medium size and which are good for storing of seeds. **How? :** Our members they carry those potatoes on the head and took it to market.

- ***Do you know where other markets are***

Answer: yes we know other market but we sell our production in the GASARENDA market. Because our production are still not enough we work on the GASARENDA market means we don't have enough production to go to the other market.

- ***How much you use for seed potatoes***

Answer: to the production of the last season we didn't store the seeds from those production or those potatoes because all production were diseased.

- ***Why this amount***
- ***Why not more or less?***

3 – What varieties you produce

Answer: **cruza;** but in the beginning we were given so many varieties like **nderera; ngunda; kigega; cruza; sangema; gikngu.**

- *try to find out why*

Answer: But till now we produce only **cruza** because it is the only one variety which try to perform well in our land and also in this region. **Cruza** also is the only variety you can find in the GASARENDA market when you are going to buy seeds in the market.

- *Would you prefer to maybe change to another variety*

Answer: we will change this variety when we will find other variety because also **cruza** become weak.

The following question are about information you need for your performance on the field. Therefore we are curious to your information about the prices, fertilizers and production techniques.

4 - From whom do you receive information about prices?

Answer: we choose to sell to certain prices according to force and energy we spent in all those activities we did. And we try to see if the prices which are on the market are good or bad after we make a decision. When the prices are lower we try to store so many seeds.

- *Name the institutions and where*

Answer: control comity of the group because at least are those these who are in charge.

- *Why those*

Answer: because are in charge and no other e find to help us.

- *Do you still need extra information*

Answer: yes.

5 - From whom do you receive information about fertilizers?

Answer: here the only facilities we have on the sector office there is a policy called NKUNGANIRE where they gave to farmers a fertilizers on the half of the normal prices.

- *Name the institutions and where*

Answer: NKUNGANIRE policy.

- *Why those*

Answer: is the only you can find.

- *Do you still need extra information*

Answer: yes, but also if is possible to find other trainings and field visit it will help us.

6 - From whom do you receive information about production techniques?

Answer: are only the facilitators who help us how we have to plant well the potatoes.

- *Why those?*

Answer: are those only who are found and who are trained to grow potatoes.

- *Do you still need extra information*

Answer: yes, but if is possible to train all members it will help a group to develop quickly.

8 – Why do you rotate with other crops?

Answer:

- To rotate help us to reduce diseases in the land.
- To grow the same crops successively give the lower yields.
- Rotation help us in the policy of the land use consolidation.

- some examples of rotational crops?

Answer: maize, common beans, wheat

- Do you collectively act on the market?

Answer:

- How

- Why (not)

- Where

- When no? Why don’t you, what is the reason?

- When do you harvest your potatoes?

Answer: when the potato is fully grown

- Another reason?

Answer: the reason is we predict to store seeds from those production as we learn from our facilitator seeds are taken those which are fully grow.

- With which institutions do you directly cooperate? And with whom would you like to cooperate more?

Answer: no other institution which we cooperate with it, but only RAB helped us in the beginning in giving us seeds and other help.

- Do you think you will get more income when you go to the markets yourself?

Answer: yes, but we don’t have enough production to go to the market.

- Would you like to go the markets yourself?

Answer: yes, but just now we have access only to the GASARENDA market because our production are still less not enough. But we know to go to market yourself is good and we want it.

- How far is the market from your production?

Answer: is around 6km.

- Who of you check if the potatoes correspondent with what the buyers want?

Answer: we are not yet on that stage we still down, but we understand that is a good thing we will do it, we will put that person in charge.

- why yes or no?

- Who of you goes to the market to find out what the customers want in the next season?

Answer: we go to the market only when we have the production, is only that time we go there to see how prices is on the market. We still have less production.

How do you check? (asking traders, Rab, customers)

- Who of you check the best market/customer to sell the potatoes

- Why, or not

- **Who of see opportunities and also realise the opportunity?**

- Why you don’t realise the opportunity and why you do or don’t see opportunities.

- Who of you can easy access credit for the next season to buy for example seeds

Answer: we a saving account but we don’t yet ask loans, we use only our money.

- what are common problems of the credit/financial institutions

- Who of you focus on cost reduction? And how do you try to reduce costs.

Answer: as a group we make decision together.

- We bring manure ourselves without spending other money in buying manure.
- We prepare field ourselves
- To carry production on the market we do it ourselves on our head.

-Who of you go to credit/financial institutions to get a loan or credit for your inputs? And which credit institutions you go to?

- Who of you focus on harvest increase? And why or why not?

- Who of you try to change the production process? why

6. When all your questions have been asked, and before the group discussion ends, ask if anyone has any other comments to make
7. don't forget to thank the group for coming

Annex E.16: FGD ABISHYIZEHAMWE Nyamagabe

There was on 5th July 2013 where we meet with IAMU ABISHYIZEHAMWE in uwanjyogoro village,Mudasomwa cell,Uwinkingi sector , Nyamagabe district , in Southern province .they started on 2nd may 2012,It is composed by 26 members, 15 men and 11 women their target is to produce good seeds to supply good seeds to their neighbors and to improve their food security to their family and themselves .When they were starting ,RAB gave them the seeds (mabondo,cruza,sangema, Kirundo and Victoria).These seeds were 100 kgs and they harvested 392kgs. Of which 260 for home consumption, and 22 kg for the market.

Group members

1. Rusingizandekwe Sylvain president
2. Bucyanayandi J.Bosco Accountant
3. Nyiranzeyimana Jeannette v/president
4. Mureramanzi Venuste Advisory
5. Mariro Theoneste
6. Nsengimana Salatier
7. Mbazende Straton
8. Sindikubwabo Vianney
9. Munyanziza Damascene
10. Ukwitegetse Emmelyne
11. Ntiberinda Celestin Advisory
12. Mbarubukeye Alon
13. Nturo Frederic
14. Nyiragiraneza sifa
15. Nsanzimana Philmon
16. Mukangenzi Mariette Secretary
17. Nzabakenga Vedaste
18. Benimana Vedaste
19. Nkundabaza Emmanuel
20. Nzirorera Vincent
21. Hagumineza Cyprien
22. Uwamahoro Judith
23. Nyirabizimana Bernadette
24. Musabyemariya Thacienne
25. Nirere Emmerance
26. Mukabahinyuza Bernadette

1 - How much of the potatoes you sell to the market

Answer : 22 kgs for market (consumption potatoes

Why

Answer: Because they need money for fertilizers, insecticides and $CaCO_3$ for the next season.

Where do you sell (why, how and when at this place)

Answer:Gasarenda market Because they have not high production to transport.they use the head when they harvest immediately.

Do you know where other markets are

Answer: not yet because they are new producers

How much you use for seed potatoes

Answer : 110 kgs for seeds of next season (for own seeds)

They produc those seeds for the next season. In order to harvest more seed potatoes than the current harvest, because they want to be the supplier of seeds to their neighbours, when they produce more seeds.

Why this amount

Answer: Because their target is to produce seeds and to supply the seeds to their neighbours.

3 – What varieties you produce

Answer :cruza, kirundo, Victoria, sangema, mabondo.they try to produce all varieties then they will choose which are better than others to their soil. But now they seen cruza and mabondo are matched with their soil. There is other variety called Kinigi, It can produce more these varieties RAB gave them.

The following question are about information you need for your performance on the field. Therefore we are curious to your information about the prices, fertilizers and production techniques.

4 - From whom do you receive information about prices

Answer: It depends of market. Themselves go to ask the prices on market.

Name the institutions and where

Do you still need extra information

When they start to produce more seed, they can contact the institutions like RAB to come to buy their production.

5 - From whom do you receive information about fertilizers

Name the institutions and where

*A*nswer : It is only a facilitator

Do you still need extra information

Answer: yes, because to learn is always and they need books say about potato production in order to increase the knowledge on Irish potatoes.

6 - From whom do you receive information about production techniques

Name the institutions and where

Answer: It is only facilitators. There is not others coming to inform them

Why those

Do you still need extra information

They need other information because they want to be the good producers of good seeds even they are new.

8 – Why do you rotate with other crops

- some examples of rotational crops

Answer :they rotate with maize , wheat , beans and vegetables. Because there are some diseases of Irish potatoes left in the soil .It is in order to control diseases and to fertile the soil by using some vegetables like leguminous.

- Do you collectively act on the market.

Answer: Not yet because they harvest only one season. They sell only 22 kgs .

- How

Answer; they use their head

- Where

*A*nswer: in Gasarenda market.

- When no? Why don’t you, what is the reason?

Answer : because they do not start to produce more because they are new producers.

- When do you harvest your potatoes,

Answer: they harvest when potatoes are fully grown because they need to produce good seeds.

- With which institutions do you directly cooperate? And with whom would you like to cooperate more?

Answer: They prefer RAB because it is RAB given them the first seeds.

- Why not?

- Do you think you will get more income when you go to the markets yourself?

Answer :Yes, Because when a farm start to produce more it is good to supply his or her production in order to get more income . We will be known on market. They prefer to go to the markets themselves when they start to produce more because Now, they are new.

- Would you like to go the markets yourself?

- How far is the market from your production?

Answer: It is not far away. It is 2 km from here.

- Who of you check if the potatoes correspondent with what the buyers want?

- Why yes or no?

Answer: No, they do not because they sell only 22 kgs in order to buy fertilizers and insecticide they will use in the next season.

- Who of you goes to the market to find out what the customers want in the next season?

How do you check? (Asking traders, Rab, customers)

Answer : They do not check because they do not start to go to the market because they harvested only one season.

- Who of you check the best market/customer to sell the **potatoes**

- Why, or not

Answer : Not because they do not start to go to the markets because they are new producers

- **Who of see opportunities and also realise the opportunity?**
  - Why you don't realize the opportunity and why you do or don't see opportunities.

Answer : just now they do not realize the opportunity because they start early.

- Who of you can easy access credit for the next season to buy for example seeds
- what are common problems of the credit/financial institutions

Answer: They do not start to get a credit because they start early but they predict to have a bank account and to ask a loan to local bank like SACCO and PBR.

- Who of you focus on cost reduction? And how do you try to reduce costs.
Answer: None because they do not start to sell their production to the market.

-Who of you go to credit/financial institutions to get a loan or credit for your inputs? And which credit institutions you go to?
Answer: None they observe as whole association, because they start early.

- Who of you focus on harvest increase? And why or why not?
Answer: None because they are new.

- Who of you try to change the production process? Why
Answer: None because they do not start to produce more because they are new producers. But they hope to change the production process when they get more information about them.

Annex E.17: FGD Musanze

Focus Group discussion 31-5-2013
Time: 10: 30
Interviewer: Iyakaremye Celestin

It was in the morning Friday on 31st May 2013 firstly we went to sector office as allowance for walk in that village, we met with executive secretary that sector and in time without any constraints he gave us his signature and stamp as a permission to walk in village and also to meet with farmers as our purpose.
After 30 minutes we met with Enias as a facilitate to help us to found farmers of potatoes. The group of farmers we met was 26 members, female are 20 and male are 6. When we reached there their presence was like this 14 members who were divided in 7 female and 7 male.
Their name:

- NSENGIYUMV Advent (president)
- DUKUZUMUREMYI Jean marie vianney (accountant)
- GAKWAYA Faustin (advisory comity)
- KARAHAHOZE Enias (advisory comity)
- UWIMANA Pierre Celestin (member)
- NIZEYIMANA Vestine (member)
- NYIRABAPAGASI veneranda (member)
- NYIRAZUBA leocadie (member)
- KIZA Didace (member)
- AYINKAMIYE Gaudance (member)
- MUSABYIMANA Jeannette (member)
- MUKANDEKEZI Esperance (member)
- BAMPORINEZA Jacqueline (member)
- NIYONSENNGA legis (a member)

We begun with our introduction and also we introduced why we were there. Themselves also introduced their Association is called ITUZE and they told us shortly in future they are going to a cooperative.

The ITUZE association is located in musanze district, MUKO sector, NTAMIZIRO village the FGD was done in store house.
Goals of association is:

- to grow potatoes in order to produce a good seeds
- to supply good and quality seeds in sectors of MUSANZE DISTRICT.

Questions:

1 - How much of the potatoes you sell to the market (count the people who sell at the field and at the market)

Answers: their purpose is to produce seeds, and also they told us their produce 10 tons per season, here they sort the best potatoes for storing them as seeds, those are sorted are 2 tons of seed potatoes. The potatoes with a large size and potatoes which are damaged are going to the market for consumption. But also a share goes to the members themselves (4 tons) and other 4 tons remains are sold to the market. (Enias and NSENGIYUMVA)

- ***Why***

That amount is sold because they have no other resources for getting money for next season.

- ***Where do you sell (why, how and when at this place)***

Answer: They sold potatoes on the field because they have no truck for transporting their product and also to hire a truck is too expensive.

- ***Do you know where other markets are***

Answer: Yes there are markets like MUSANZE, KIGALI markets, but almost all buyers sell their potatoes in small shops and other buyers are neighbours who want potatoes for their own consumption.

- ***How much you use for seed potatoes***

Answer: 2 tons

- ***Why this amount***

Answer: the first reason is that they have small field which is compatible to that amount, and that amount is that which have all conditions to be sorted like seeds.

3 – What varieties you produce

Answer: they produce the varieties; **kirundo, kinigi, victioria, cruza, mabondo and sangema**

- *try to find out why*

Answer: because those variety are compatible with the climate in that sector but the farmers prefer the variety **cruza,** because it give a good yield and is more tolerant against diseases.

- *Would you prefer to maybe change to another variety*

Answer: as it said above they want to promote **cruza (** NSENGIYUMVA)

- *But why you do not change*

Answer: the **cruza** is preferred because two reasons, give high yield and tolerant diseases (NSENGIYUMVA)

The following question are about information you need for your performance on the field. Therefore we are curious to your information about the prices, fertilizers and production techniques.

4 - From whom do you receive information about prices

Answer: No other institution interfere in fixing prices, the prices are influenced by market itself, how the production are produced in that time, when the production is more the price reduced and when the production is fewer the prices increases. The farmers go to the market for asking information about prices.

- Are all of you going to the market, or is there any representative?
- *Name the institutions and where*

Answer: no institution

5 - From whom do you receive information about fertilizers

Answer: not anyone taught them about fertilizers. Also other institution didn't inform us about fertilizers.

- *Do you still need extra information*

Answer: if RAB OR MINAGRI provide for us information about fertilizers it will be better to us and we need it more.

6 - From whom do you receive information about production techniques

- *Name the institutions and where*

Answer: it is IPM (integrated pests management) taught us some techniques

- Those techniques are: to plant with spacing.
- *Do you still need extra information*

Answer: we want more training and more information for increase in our production.

7 – Who of you buy seeds from large seed suppliers(count)

Answer: as an association, ourselves our purpose is to produce seeds and supply those seeds in other farmers but sometime when we have not our seeds we go to check it to in other villages.

- *Why*

Answer: because there is no independent seeds suppliers who work in this region.

8- Who of you like to lead a group

Answer: as an association we have a comity which lead our association

- *Why*

Answer: because our comity are more people they make decision which are good, when comity discuses to problems they take best decision than how one people can make it.

9- When you would receive a higher price with washing or packaging, would you wash or package the potatoes?

Answer: as FFS group to do it as a group is the best

10 – Why do you rotate with other crops

Answer: we rotate crops for eliminate diseases and reduce diseases because crops have different types of diseases means the diseases of Irish potatoes are not the same of the diseases of other crops.

- some examples of rotational crops

Answer: maize; common beans

- Do you collectively act on the market.

Answer: no Market is on the field buyers come to take the Irish potatoes on the field

- Why ?

Answer: because we do not have enough production which can make us to hire the truck for transporting the potatoes to the market ourselves.

- When do you harvest your potatoes

Answer: when the potato is fully grown because fully grown potatoes is which you can sort from them best seeds.

- With which institutions do you directly cooperate. And with whom would you like to cooperate more?

Answer: there is no institution is only IAMU and other facilitator who come to helped us

- Do you think you will get more income when you go to the markets yourself?

Answer: we think out it and we need to get to that level but we have no investment for doing that but if we found a help we will do it because we think it can increase our income.

- Would you like to go the markets yourself

Answer: yes we like it but we have no investment.

- Who of you check if the potatoes correspondent with what the buyers want?

Answer: we do not take care about it.

- why yes or no?

Answer: because we produce the production which is not enough.

- Who of you goes to the market to find out what the customers want in the next season?

answer: we do not go to the market.

- **Who of see opportunities and also realise the opportunity?**

Answer: as an association we work together to look for what can help our association to grow up

- Who of you can easy access credit for the next season to buy for example seeds

Answer: we are not yet get to the level of asking for credit.

- what are common problems of the credit/financial institutions

Answer: we do not have guarantee

- Who of you focus on cost reduction? And how do you try to reduce costs.

Answer: as an association we do all activities concerned in the field for avoiding to spent more money.

- Who of you focus on harvest increase? And why or why not?

Answer: we work as an association every member who found how our association can develop tell other members and agronomist of sector help us.

- Who of you try to change the production process? Why

Answer: is the executive comity who discusses about it and announce the decisions to the whole association.

Annex E.18: FGD NDIKUBWIMANA, Musanze

Focus Group Discussion at Musanze
Date: 27-5-2013
Time: 14:00

Before we start the Focus Group Discussion the FFS facilitator showed us the fields and the tot field. We begun with an introduction, we introduced ourselves and we provided a time for introduction those farmers who helped us in our research. With this FGD we hope to further understand the entrepreneurial perception of the potato farmers.

We get in contact with a group of farmer located (village district cell) FFS group in the area kora ubeho They had in meeting and before the meeting started they proposed to do the focus group discussion. The FGD was done in a storage building in building process for seed potatoes.

Thijs Boer introduced his research and why we are in Musanze.
The interviewer: IYAKAREMYE Celestin
And MUREKATETE Jeannette helped in writing notes and some comments.
7 man and 2 woman attended the group discussion: NDIKUBWIMANA
MBONIGABA Emmanuel (control comity)
Jean damascene (a member)
KAREGEYA appolinaire (V/C president)
NDAYAMBAJE (secretary)
NYIRANIZEYIMANA Odette (a member)
MUKANDAYAMBAJE solange (a member)

Questions:

1. **Who is producing more than 50% of the potatoes for their own consumption ?**
   Answer: The group explained it is not for consumption, they produce potatoes in targeting market and to produce seeds. (KAREGEYA appolinaire),
   Comments: we predict that we want to make our cooperative professional (KAREGEYA appolinaire). Our cooperative have 15 members.
2. **To whom do you sell your potatoes ?**
   Answer: the group explained they sell their potatoes in UGANDA markets, Kigali markets, Musanze markets and local people who don't produce potatoes (Jean damascene)
3. **Do you prefer cruza variety or kinigi variety ?**
   Answer: we prefer kinigi firstly, kirundo variety, mabondo variety cruza variety and sangema variety. (jean damascene)
   Comments: Kinigi is a variety which has a high performance and in the markets the prices are above when you compare with others about 20 frws (karegeya appolinaire)
4. **From whom do you receive information about prices ?**
   Answer: the prices depends on the seasons and markets (NDIKUBWIMANA). Minagri and RAB do not give information about prices. The participants compare seasons to understand the fluctuations of prices. Because the participants do not have good storing facilities they are not able to wait for a better price.
   Comments: Seasons influence prices when production is more than what we predicted before and markets also influence when so many people want potatoes and in that time are less. (MB ONIGABA Emmanuel)
5. **From whom do you receive information about fertilizers ?**
   Answers: RAB, FFS (IUM) Urugaga imbaraga. (V/C president)
   Next time ask if this is good information
6. From whom do you receive information about production techniques ?
   RAB, FFS, MINAGRI
   Next time ask whether this is good information
7. Do you know where the markets are ?
   Answers: buyers come on the field with balance and weight potatoes then took it where they want (especially it is the markets)
   Comments: no reasons for taking those potatoes in the markets because buyers themselves come on the field.
8. **With which others crops you rotate on the field ?**
   - why

   Answers: beans and maize (NDIKUBWIMANA)
   Comments: they rotate potatoes with bean and maize for controlling diseases. (NDIKUBWIMANA)

Do you collectively act on the market ?

- how
- why
- where

answers: no reasons for taking those potatoes on the markets because buyers themselves come on the field and pack those potatoes. (this questions is the same others which are answers above)

when do you harvest your potatoes,

- when the prices are good ?
- or when the potatoes is fully grown ?
- another reason ?

answers: we harvest our potatoes when the potatoes are fully grown

with which institutions do you directly cooperate, and with whom would you like to cooperate more ?

answers: we cooperate with other institutions but is in the same manner, those institutions are RAB, MINAGRI, URUGAGA IMBARAGA

do you think you will more income when you go to market yourself ?

answers: we do not take time think about market because buyers come on the field.

Would you like to go the markets yourself ?

- how far is the market from your production ?

answers: no markets, buyers come on the field, and this means distance is zero (0)

who of you saves money for the next season to buy for example seeds ?

answers: as our purpose is to produce seeds, we use our own seeds no one gives us money for buys those seeds and no loans.

Who of focus on cost reduction ? and how do you try to reduce costs ?

Answers: we use some natural techniques like fallow and cultural practices for reduce cost we send when we buy fertilizers and pesticides. (KAREGEYA appolinaire)

Comments: we need to improve our production but in using natural techniques for avoiding those chemicals from industry, because those from industry damage and destroy nature and other small living like bees and other which facilitate in pollination. (Jean damascene)

Who of you go to credit/ financial institutions to get a loans or credit for your inputs ? and which credit institutions you go to ?

Answers: until now we are not ask for loans we use our own money but we want to plan that to project in our future. (MBONIGABA Emmanuel)

Who of you focus on harvest increase ? and why or why not ?

Answers: together as a cooperative we have to take care to that issue of increasing our harvest or production (KAREGEYA appolinaire)

Who of you try to change the production process ? why

Answers: as a cooperative we make some field visit or field trip to look for what others achieve and to adopt some techniques.

Comments: like we have our member who went there in France to visit there (is vice president) and some time we become invitees in tradeshow prepared by MINAGRI. for example we are invited in tradeshow of MINAGRI which will take place in Kigali to 11th to 18th June 2013

Needs of cooperative

We need as a cooperative, universities and other institutions concerned to agriculture to come in our region especially in our cooperative to do their research here.

We need greenhouses for producing the best seeds ourselves and not wait for RAB.

Problems a cooperative faced

- to lack enough money for big investment
- to lack of seeds and when are found, it is in out of season

G. Rich picture

Annex G.1 Rich picture with farmers in Musanze