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Preconditions for and barriers to use of organic agricultural methods in Uganda

- Exploring farmers' perspectives through the Theory of Planned Behavior

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Preconditions for and barriers to use of organic agricultural methods in Uganda – Exploring farmers' perspectives through the Theory of Planned Behavior

Förutsättningar och hinder för användandet av ekologiska odlingsmetoder i Uganda – Jordbrukarnas perspektiv utforskat med hjälp av Teorin om Planerat Beteende

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Foreword

With a background in the field of environmental science a large part of my previous education has included agriculture as nothing but a problem creator, however necessary to produce the food we put on our tables. Focus has been put upon repairing damage created by unsustainable farming methods, which in the end did not seem very constructive to me. Because of this, my main interest when joining the master's program in Agroecology at the Swedish University of Agriculture in the fall of 2010 was how to prevent agriculture from harming the environment.

As the program went on the various courses about agroecology and production systems opened my mind to other aspects of agriculture, and I started to see it not as a necessary evil, but as a part of everyday life with important economic and social aspects for millions of people around the world. These new perspectives made my interests change towards how we can create an agricultural system where enough food is produced and where the farmers can support themselves, without putting the environment in second hand.

From focusing primarily on the environment, my understanding of sustainability went to include also economic and social aspects; of equally importance as so often emphasized within the field of agroecology. Today I see how agriculture both can support and depend on resources from its surroundings. Carrying out a field study among smallholder farmers in Uganda has taught me how deeply interlinked agriculture is with both environment and society – a linkage we cannot ignore when trying to establish a sustainable agriculture.

Emmelie Johansson
Lund, June 2012

Abstract

Organic agriculture has been promoted as a promising alternative to improve food security and increase incomes for smallholder farmers in developing countries. Uganda is one of the countries where organic is being promoted, but in relation to the total size of the agricultural sector, the number of organic farmers in the country is still low. Little is known about why, or why not, Ugandan farmers use organic methods. This thesis aims at closing this knowledge gap by exploring the preconditions and barriers Ugandan farmers see to the use of organic methods for soil fertility management and crop protection, and discuss possibilities and constraints to an expanded use. The theory of planned behavior (Ajzen, 1991) was used as a model to explore farmers' intentions to use organic methods and control factors affecting them. Semi-structured interviews were carried out in Rakai and Luweero districts in Uganda's central region with a total of 45 organic and 36 conventional farmers.

Farmers in Uganda use many different methods to manage soil fertility and crop protection. Organic methods are used also by conventional farmers, but they combine them with artificial inputs. Both organic and conventional farmers saw many advantages and disadvantages with both organic and conventional methods. Findings from the study support the theory of planned behavior in that behavioral intentions to use organic methods are influenced by attitude, social pressure and level of perceived behavioral control. Farmers with intentions to use organic methods can be hindered by low amount of actual control over the behavior.

Attitudes originating from behavioral beliefs about profitability, together with perceived behavioral control i.e. the perception of how easy or difficult it will be to successfully carry out the behavior, seemed to be the most important influencers over farmers' intentions whether or not to use organic methods. Perceived social pressure from important others, e.g. extension workers and export companies also influenced the farmers' intentions. Regardless of intentions, the decisive factor affecting many of these farmers was the amount of actual control they had. Availability and affordability of both artificial and organic inputs, and of labor, highly affected which methods the farmers ended up using.

Many conventional farmers expressed a wish to use only organic methods, but saw things stopping them from this. Removal of these barriers is an opportunity to expand the use of organic methods in Uganda. Most organic farmers would like to continue to use organic methods; and this positive attitude is the most important precondition for use of organic methods. However, some of these organic farmers saw issues that might force them to change to conventional methods and artificial inputs. These issues were in general the same as what was seen as barriers to the use of organic methods by the conventional farmers; lack of organic material, lack of labor, lack of knowledge, and lack of profit due to markets that do not distinguish between organic and conventional products. It is therefore important to address these to create an enabling environment for use of organic methods in Uganda.

This thesis contributes with a better understanding of why, or why not, Ugandan farmers use organic methods, and the preconditions for, and barriers to, use of organic methods that exist today. These findings form a basis from which further research deeper into aspects of the subject could be built.

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1. Introduction

1.1 Problem background

Whilst serious food shortages frequently occur in the East African region, Uganda is a net exporter of food and considered to be self-sufficient in food at the national level (Mukhebi et al, 2010). Despite this, the situation can be different on a local level (Walaga and Hauser, 2005), with hunger and malnutrition still important problems to solve (UNEP-UNCTAD, 2008b). Population growth has increased the number of Ugandans living in food insecurity (MAAIF, 2009), from 12 million in 1992 to 17.7 million in 2007 (Bayite-Kasule et al, 2011) and is an important cause to the decline in per capita agricultural GDP that has occurred in recent years (Mukhebi et al, 2010). Uganda's current total population is 33.8 million (FAO, 2011). The agricultural productivity growth rate is at 2.6%, while at the same time the population growth rate is at 3.5% (Bayite-Kasule et al, 2011).

To obtain food security for poor rural households in Uganda, it is vital to improve agricultural productivity (Namassi, 2008). Productivity growth in agriculture has primarily been a result from area expansion, not from production intensification leading to higher yields (MAAIF, 2009), which can become a future problem since arable land in Uganda may run out as early as year 2022 (NEMA, 2007). The agricultural sector employs 70% of the labor force (MAAIF, 2009), but contributes to only 17.5% of total GDP (FAO, 2011). The agricultural sector in Uganda consists mainly of smallholder farmers with an average land area of 3 hectares each (Walaga and Hauser, 2005). In the Uganda Census of Agriculture conducted 2008/09, 56.7% of the agricultural households reported that they could not afford to eat what they would normally eat during that reference period. 71.4% of these agricultural households identified insufficient production or loss of crops as the major reason behind the shortage of food (UBOS, 2011).

Smallholder agricultural production is constrained by poor soil fertility (Namassi, 2008). Soil nutrient depletion is a big problem in Uganda (Mukhebi et al, 2010; Omamo, 2003; Omiat and Diiro, 2005; Zake et al, 1999). The country's soil nutrient depletion rate is one of the highest in the world (Namassi, 2008) and the highest in South Saharan Africa, SSA (Omiat and Diiro, 2005). Another problem in the production is crop losses due to pests and diseases, with average losses of 10-20% during the pre-harvest period and 20-30% during the post-harvest period (MAAIF, n.d.). The overall crop loss caused by pests and diseases is higher than that caused by drought and soil infertility (Bonabana-Wabbi et al, 2006). As an example, during 2005 losses due to Banana Bacterial Wilt disease were as high as 94% in Mbale district, with economic losses of U$34 million (MAAIF, n.d.). Improving soil fertility management and crop protection are arguably important issues to address to improve the agricultural productivity and thus enhance food security in Uganda. Opinions differ on how this improvement should be achieved.

Uganda has a very low use of artificial fertilizer and agrochemicals, originating in political instabilities in the past which have hindered modernization of agriculture (Parrot and Marsden, 2002). Uganda is reportedly among the countries in the world using the lowest amount of artificial fertilizers, with an average of 1kg/ha (UNEP, n.d.; Walaga and Hauser, 2005). Even though the application of artificial fertilizers has increased during the past decades (Omiat and Diiro, 2005) it is still well below the average 9kg/ha for rest of SSA (Opolot et al, n.d.). Chemical pesticides are mostly used on specific cash crops like tomatoes for the domestic market and coffee for the export market (Walaga and Hauser, 2005). While

some argue that increased external inputs in the form of artificial fertilizers and chemicals is the best way to go to improve the agricultural productivity (Bayite-Kasule et al, 2011; Bumb et al, 1992; Larson and Frisvold, 1996), others claim that a high-input agricultural system is not suitable in Uganda because of its dependency of external resources (Walaga and Hauser, 2005) and suggest that organic methods are a better option for smallholder farmers since they make use of locally available resources, stabilize yields, improve incomes and enhance food security (Bouagnimbeck, 2011; UNEP-UNCTAD, 2008a; UNCTAD, 2009; Walaga and Hauser, 2005). Although major constraints to food security in general are not found in production methods, but rather lies in social, economic and political conditions, population growth increases demand for food so alternative food production systems such as organic agriculture needs to be acknowledged (IFOAM, 2002).

The low use of artificial inputs in Uganda is seen by some as a good opportunity to pursue organic agriculture (Pender and Mertz, 2006; UNECA, 2011; UNEP, n.d.; Walaga and Hauser, 2005), and use of organic methods is not only suggested to increase agricultural yields, but also to have social benefits through increased income and be beneficial for the natural environment in form of improved soil fertility, biodiversity and water supply (UNEP-UNCTAD, 2008b). The number of certified organic farms in Uganda is close to 190 000 (Willer and Kilcher, 2012), most of them smallholders with an average of 1.3 hectares (Namuwoza and Tushmerirwe, 2011). In addition to this there is an estimated 120-160 000 farms following the principles and methods for organic farming, but without certification (Walaga and Hauser, 2005). The number of certified organic farmers in Uganda is the second highest in the world (after India), and the highest in Africa (Willer and Kilcher, 2012) but considering the total size of the agricultural sector in Uganda many more farmers could potentially benefit from the use of organic methods.

1.2 Problem statement

To facilitate a spread of organic methods amongst farmers in Uganda, there is a need to know why some farmers use organic methods – while other farmers use conventional methods. The opinions among scholars in this question differ.

Agriculture in Uganda has a tradition of using very small amounts of agrochemicals and this has led to it being defined by some as "organic-by-default" (Kidd et al, 2001; Nalubwama et al, 2011; Van Elzakker and Leijdens, 2000; Bigirwa, 2005). This has the understanding that farmers cannot access or cannot afford artificial inputs, and that this is the reason why they are organic (Walaga and Hauser, 2005; Kidd et al, 2001). However, Kidd et al (2001) point out that defining traditional endogenous farming systems as "organic" simply because they lack artificial input, is to misunderstand the concept of organic farming, which according to Walaga and Hauser (2005) is also about using specific methods e.g. nutrient recycling and crop rotations to maintain soil fertility. Walaga and Hauser (2005) state that the practice of organic agriculture is a deliberate decision by farmers since they have to adopt organic principles and practices, and thus using organic methods without being certified is not being "organic-by-default". Certified organic farmers on the other hand are often said to choose organic methods for the possibility to obtain a premium price for their products (Kidd et al, 2001). Nalubwama et al (2011) reports that some farmers in Uganda use organic farming methods to access the growing markets for organic products in Europe and North America.

These different opinions suggest that more knowledge is needed to understand why farmers in Uganda use organic or conventional methods, if it is an active choice made by the farmers, or if there are external factors that limit them to the use of specific methods. Barriers to the use of organic methods have been found in different studies around the world. Canadian farmers identified lack of knowledge about organic methods and lack of market opportunities for organic products as important barriers (Khaledi et al, 2007), while American farmers also saw crop losses to pests and diseases as a constraint (Johnston, 2010). A study in Bangladesh found lack of labor and unavailability of organic inputs as challenges needed to be addressed (Sarker and Itohara, 2008). The specific barriers and constraints faced by Ugandan farmers need to be identified and removed to increase the use of organic methods.

Toric (2005) claims that many factors influence farmers' land use practices, and points out the importance to understand these factors to be able to develop successful policies, programs and extension strategies to increase the use of sustainable land management practices. Results from studies investigating farmers' decisions can be useful to policymakers and others concerned with spreading the use of organic methods (Fairweather and Campbell, 1996). Decision-making on the farm is influenced by institutional settings and the farmer's economic and social context, so any policies or interventions aiming at supporting growth in organic farming must consider why farmers do, or do not, use organic methods (Fairweather, 1999). When this knowledge is obtained it is possible to make changes, remove barriers and create an enabling environment for increased use of organic methods in Uganda.

1.3 Research gap

This thesis aims at closing the knowledge gap that exists regarding why farmers in Uganda use organic respectively conventional methods for soil fertility management and crop protection, by looking at it from the farmers' own perspective. It will explore the preconditions and barriers Ugandan farmers see to the use of organic methods.

Overall there is limited research going on in the organic sector in Uganda (Namuwoza and Tushmerirwe, 2011; Opolot et al, n.d.). Research on organic farmers does not commonly focus on their motivations and decision making (Fairweather, 1999; McEachern and Willock, 2004). Most studies on organic agriculture in Uganda are evaluations, many project specific, of the difference in terms of yield, income or standard of living between farmers using organic and conventional methods (e.g. Jacobsen, 2009; Forss and Lundström, 2004; Gibbon and Bolwig, 2007). Many studies and articles have a clear market-orientation and focus on how to improve organic markets and increase organic export or have a specific focus on what should be done, in terms of policies, standards and certification systems to facilitate the expansion of the organic sector (e.g. UNEP-UNCTAD, 2008a; Walaga, 2005). These studies are not based on the farmers' perspective, despite the fact that Altieri (2002) suggest that if agricultural research is to benefit the rural smallholders, it should take on a "bottom-up" approach, with local people's knowledge, needs and aspirations as a starting point.

Studies have been conducted in other countries about why or why not farmers use organic methods (e.g. Hattam, 2006; McCarthy et al, n.d.; Wehinger et al, 2002), but the author of this thesis has not been able to find a similar study conducted in Uganda. When coming with suggestion on how to expand the organic sector in Uganda it is also common to base recommendations on case studies from countries like e.g. Denmark, and while it is important to learn from others it is equally important to perform studies in Uganda to find out how the situation is for farmers there.

Why farmers use different methods for soil fertility management and crop protection is a relatively unexplored subject in Uganda. Bayite-Kasule et al (2011) tried to identify major determinants of artificial fertilizer use among smallholder farmers in Uganda, by using a quantitative analysis and assessing relationships between characteristics of the farm household, such as farm size and access to motorcycles, and fertilizer use. Their model was however unable to clearly explain why or why not participating farmers use artificial fertilizer (Bayite-Kasule et al, 2011). This implies that other factors than characteristics of the farm household lies behind farmers' use of different methods, and that a qualitative approach with more in-depth interviews with farmers is more likely to reveal these factors.

1.4 Purpose

The overall purpose with this thesis is to, through a farmer's perspective; explore what preconditions and barriers there are to the use of organic alternatives for soil fertility management and crop protection in Uganda. This demands an understanding of which methods that are used today, and why the farmers use these specific methods. With this information as a base, possibilities and constraints to expand use of organic methods for soil fertility management and crop protection in Uganda will be discussed. This will be done by applying an agro-ecological approach, looking at environmental, social and economic aspects.

This thesis does not claim that use of organic methods for soil fertility management and crop protection is the best option for improving productivity and thereby food security in Uganda, and its purpose is not to investigate whether or not this is the case. It simply acknowledges that organic methods are promoted by many as a promising option, and sets out to investigate preconditions and barriers to the use of organic methods from a farmer's perspective.

1.5 Research Questions

The following research questions have been set up to help reach the purpose described above:

Research question 1. What methods for soil fertility management and crop protection are used by the farmers in Uganda today? This question aims at understanding the situation and the environment in which the study takes place.

Research question 2. What advantages and disadvantages do farmers in Uganda see with organic and conventional methods respectively? This is posed as a research question since the answer might not necessarily be the same reasons as why farmers use organic methods or not, but helps to understand farmers' opinions on different methods and can thus give a clearer picture on possibilities to increased use of organic methods.

Research question 3. Why, or why not, are organic methods for soil fertility management and crop protection used by farmers in Uganda? The aim here is to find out the underlying factors behind farmers' use of different methods.

Research question 4. What methods would the farmers in Uganda prefer to use if they could choose freely without being limited by external factors? This is investigated because farmers' choice of method might be limited by the amount of actual control they have over the situation, and it helps to identify barriers to use of organic methods.

Research question 5. What would make Ugandan farmers today using conventional methods switch to organic methods? This is posed as a research question to find out what needs to

change, i.e. which barriers need to be removed, to successfully expand the use of organic methods.

Research question 6. What would make Ugandan farmers today using organic methods switch to conventional methods? Of equal importance to enabling conventional farmers to convert to organic methods is ensuring that organic farmers can continue to use organic methods. The aim here is to find out what needs to be improved to facilitate for farmers to continue to use organic methods.

1.6 Short discussion on the rest of the thesis

An eight week field-study was conducted in Uganda in February-March 2012 to collect data needed to answer the research questions. A qualitative approach was considered most suitable, and semi-structured interviews were made with a total of 81 organic and conventional farmers in two different districts in Uganda. The theoretical framework used during the design of this study and in the analysis of the collected data is presented in chapter 2, "Frame of reference". The major focus is put upon the theory of planned behavior (Ajzen, 1991) used in the creation of the interview guide. The chapter contains a review of previous literature within the subject, and provides information about the two areas in Uganda where the field study took place.

Results from the field study showed that farmers in Uganda use many different methods for soil fertility management and crop protection. Also conventional farmers used organic methods to some extent, but combined them with artificial inputs. Farmers saw many advantages and disadvantages with both organic and conventional methods. The intentions to use organic methods were highly influenced by beliefs about economic performance and farmers' own perception of how easy or difficult it would be to successfully use the methods. Intentions were also influenced by perceived social pressure from important others, e.g. other farmers and extension workers. Regardless of intentions, the decisive factor affecting many of these farmers was the amount of actual control they had over the situation. Availability and affordability of both artificial and organic inputs, and of labor, highly affected which methods the farmers ended up using. Several barriers were discovered to prevent conventional farmers from using only organic methods; lack of organic material, lack of labor, lack of knowledge, and lack of profit due to markets that do not distinguish between organic and conventional products. In many cases these issues were also seen by the organic farmers as something that might force them to convert to conventional methods. It is therefore of extra importance to address these problems in order to create an enabling environment for the use of organic methods in Uganda, and some practical suggestions on how to do this are given in the discussion chapter.

2. Frame of Reference

In this chapter, the theoretical framework used in the design and implementation of this study is presented. The theory of planned behavior was used as inspiration to create the interview guide, and is therefore represented in this section. Findings from a literature review of previous research within the field will be presented, to give an idea of what has been done and what is missing. The chapter will start by providing some information about different types of agriculture in Uganda, and then move on to a description of the study areas.

2.1 The setting

2.1.1 Types of agriculture in Uganda

There are different ways to define farmers and put them into categories depending on their agricultural methods. This thesis looks into why different farmers use different methods for soil fertility management and crop protection, during conventional and organic farming. This section will give a description of what is meant by conventional respective organic agriculture. Dividing farmers into conventional or organic is however a simplification, since other authors also talk about traditional farmers (Nalubwama et al, 2011), or "organic by default" farmers (Scialabba, 2000). A brief description is therefore also given about traditional agriculture and "organic by default".

2.1.1.1 Conventional agriculture

"Conventional" agriculture is most commonly described as being dependent on inorganic inputs (Kidd et al, 2001). In this thesis "conventional" signifies the use of artificial fertilizers and/or agrochemicals such as pesticides, insecticides, herbicides and fungicides. A farmer using conventional methods might also use organic methods, but cannot be defined as an organic farmer since organic farming forbids the use of artificial inputs.

2.1.1.2 Organic agriculture as a holistic approach and in practice

Organic agriculture in its full context is a holistic approach, defined by the International Federation of Organic Agriculture Movements (IFOAM) as building on four principles; health, ecology, fairness and care (IFOAM, 2009). Uganda Organic Standards (UOS – the regulatory framework for certification of organic agriculture in Uganda) describes organic agriculture as "*more than a mere production system that includes or excludes certain inputs*" (UOS, 2006:9). However, in practice organic agriculture excludes use of artificial fertilizers and chemicals, and uses instead organic manure, intercropping, crop rotations, application of biorationals etc. (Walaga and Hauser, 2005). Nalubwama et al (2011) emphasize the importance of use of agro-ecological methods to improve production and ecosystem health in organic agriculture.

2.1.1.3 Certified and non-certified organic agriculture

Walaga and Hauser (2005) distinguish two categories of organic agriculture in Uganda: certified organic agriculture which has a market orientation, and non-certified organic agriculture that still complies with organic principles and standards. Certification means that a third party has given written assurance that the farmer fulfills the standards according to Uganda Organic Standards (UOS, 2006). The Uganda Organic Standards consists of General Principles, Recommendations and Standards. While the General Principles are the intended goals of organic agriculture, the Recommendations are practical suggestions for implementation, and the Standards are minimum requirements needed to be fulfilled to be certified according the UOS (UOS, 2006).

Certified organic products are mainly for the export market since there is no local labeling of organic products in Uganda. Opolot et al (n.d.) claim that "informal" organic production has been going on for centuries in Uganda, while the certified organic production started in 1993, when also the first organic products were exported. The National Organic Agricultural Movement of Uganda (NOGAMU), an umbrella organization bringing together all stakeholders involved in the organic sector in Uganda, are working towards increasing the domestic market for organic products, which today can be found in supermarkets, restaurants and open markets (Namuwoza and Tushemerirwe, 2011).

2.1.1.4 Compliance with minimum standards often defines "organic" today

Lockie et al (2006) make the important observation that not all organic farmers are necessarily sustainable; this can be the case also for certified organic farmers. Third party certification is the most critical factor in defining something as organic, however the certification focus on compliance with minimum standards, e.g. an organic farmer can avoid use of artificial fertilizers but do little to ensure replacement of soil nutrients over the growing cycle.

2.1.1.5 Traditional agriculture and "organic by default"

In addition there is also what is called "traditional" agriculture. The traditional agriculture in general is described as having a minimum, often non-existing, external input of artificial fertilizers and chemicals. It is therefore often perceived as organic, and what many refer to as "organic-by-default" (Nalubwama et al, 2011; Scialabba, 2000). Nalubwama et al (2011) warns for confusing traditional agriculture with organic agriculture because some traditional methods can have negative consequences for e.g. soil conditions. Scialabba (2000) defines traditional "organic-by-default" systems as systems where neither artificial inputs, nor soil-building practices are used, and claims that because of the absence of the latter these systems should not be called organic. However, Nalubwama et al (2011) states that many agro-ecological methods can however be found in traditional farming systems in Uganda, which should make it relatively easy for these farmers to adopt organic farming. Organic agriculture is often described as a combination of traditional methods and modern scientific knowledge. If using organic standards as a guide line, traditional agriculture can in some cases comply with all organic standards, and thus be counted as organic agriculture and even be certified as such. Traditional agriculture can however also include conventional methods, i.e. artificial inputs, so depending on who is making the definition traditional agriculture can be both conventional and organic, or neither of the two.

2.1.2 The study area

In this study farmers were interviewed in two different districts in Uganda, Rakai and Luweero. Both districts are part of the Central Region. The following section will provide some information about conditions in these districts, to give the reader an insight in the study areas and facilitate understanding of the results.

2.1.2.1 Rakai

The following information about Rakai district, except when otherwise noted, is collected from National Environment Management Authority's (NEMA) Rakai District State of Environment Report (NEMA, 1998). Rakai is a district located in south-west Uganda, west of Lake Victoria, between longitudes 31^{o} E, 32^{o} E and latitudes 0^{o} S, 1^{o} S. Rakai is one of the smallest districts in Uganda, with a total area of 4989 km^2, of which 3900 km^2 land. The population in Rakai district during the 2002 population census was 470 365 people (UBOS,

2006). The district headquarter is Rakai, found 190 kilometers from Uganda's capital Kampala. Poverty is high in the district, 70% of the households fall below the poverty line, and 64% of the population is illiterate. The climate is equatorial, with high temperatures and two dry seasons (January-February, June-August). Vegetation varies from medium altitude forests, through swamps, to savannas.

The main economic activity is agriculture, which engage over 80% of the population. A majority of the farmers are smallholders using traditional agricultural techniques. Subsistence agriculture is common although surplus harvest is sold to earn an extra income. The major crop grown is banana, thereafter maize, beans, ground nuts, soya beans, sweet potato, cassava and Irish potatoes. Some farmers grow horticultural crops like tomatoes, onions, cabbages and vegetables. The major cash crop grown is Robusta coffee. On a typical farm you can also find fruit trees like jack fruit, pawpaw, avocado, and orange. There is almost no mechanization of agriculture; most farmers are limited to use of axes and hoes. Irrigation is not common, and use of artificial fertilizers and chemical pesticides is very low. The productivity of the soils in the district varies from high to low. Over 75% of the soils in Rakai district are ferralitic, which means they have little mineral reserve left. The agricultural practices used have created some environmental problems, e.g. soil erosion, land degradation, soil compaction and deforestation. Because of dense population the traditional fallow system of 2-3 years can no longer be used, which has led to loss of soil fertility and declining yields. Many farmers experience great crop losses to diseases and pests.

2.1.2.2 Luweero

The following information about Luweero is collected from National Environment Management Authority's (NEMA) Luweero District State of Environment Report (NEMA, 2004). Luweero district is located north of Uganda's capital Kampala, between longitudes 32^{o} E and 33^{o} E, at latitude 2^{o} N. The total area is 5572 km^2, of which 5112 km^2 land. The population in Luweero district during the 2002 population census was 474 627 people. The district headquarter is in Luweero Town Council, 64 km from Kampala. The climate is equatorial, with dry seasons from December-February and June-July. Vegetation types in the district are forest/savanna mosaic, moist woodland, dry woodland, grass savanna and swamps.

About 88% of the population is rural, making agriculture the main economic activity. Subsistence farming is common, although most farmers can sell some surplus to get an extra income. The southern part of the district has clay loam soils, which are relatively fertile, while fertility is lower in the sandy loams in the northern parts of the district. Crops are therefore mainly grown in the southern parts, while the northern parts of the district support livestock farming. Main crops grown are pineapple, coffee, bananas, and rice. Pests and diseases, such as coffee wilt, banana wilt and banana weevils have increased in the district. About 10% of the farmers use agro-chemicals, such as artificial fertilizers, insecticides, pesticides and fungicides. Land degradation is a serious problem in the district, due to over cultivation, lack of soil and water conservation methods, inadequate application of organic matter, deforestation etc. The land degradation leads to poor agricultural production, food insecurity and increased poverty.

2.2 The theory of planned behavior

In the field of consumer behavior it is recognized that an individual's subjective preferences and perception towards a product influences the demand and because of this farmers, who can be seen as consumers of agricultural technologies, will have subjective preferences towards

available technology options (Hattam, 2006). Whether or not to use organic farming methods can be seen as an ecological behavior. According to Kaiser et al. (1999) environmental attitude alone is not enough to predict behavior since it does not take into consideration behavior constraints that are beyond an individual's control. They suggest overcoming this shortcoming by using Ajzen's theory of planned behavior as a theoretical framework for studies in the ecological domain.

2.2.1 Introducing the theory of planned behavior

The theory of planned behavior is "*designed to predict and explain human behavior in specific contexts*" (Ajzen, 1991:181). It has its origin in the theory of reasoned action (Ajzen and Fishbein, 1980). The theory of planned behavior (see figure 1) is based on three types of beliefs; behavioral, normative and control beliefs (Ajzen, 1985; Ajzen, 1991; Ajzen, 2001). *Behavioral beliefs* concern the likely outcomes of a specific behavior, and the own evaluation of those specific outcomes, i.e. advantages and disadvantages with the behavior. This leads to *attitudes* towards a behavior. *Normative beliefs* concern normative expectations of important others, and the own motivation to live up to those expectations. This leads to the *subjective norm*, or perceived social pressure. *Control beliefs* concern factors that might facilitate or impede the performance of the behavior, and the own perceived importance of these factors. This leads to *perceived behavioral control*, i.e. the own perception of how easy or difficult it will be to carry out the behavior. Together, attitude towards the behavior, perceived social pressure whether or not to perform the behavior, and the perceived behavioral control reflecting both past experience and anticipated obstacles, form an individual's *intention* to perform a certain behavior. It can generally be said that the more favorable the attitude and subjective norm is towards a behavior, and the higher the perceived behavioral control, the stronger would an individual's intention be to carry out the behavior. Attitude, subjective norm, and perceived behavioral control can all contribute to an individual's intention, but their relative importance vary across behaviors and situations. Other factors with a possible importance to formation of intentions, e.g. demographic factors and previous experience, are considered to be incorporated into the theory of planned behavior. The intention to perform a certain behavior is a central factor but there are also behaviors over which the individual might not have complete volitional control, and the behavior might be limited by the individual's *actual control*. This can be lack of money, time (resources, opportunities) etc. that hinders the individual from carrying out the behavior.

According to Ajzen (2005) perceived behavioral control can be used to substitute a measure of the actual control an individual has over a behavior. There are however cases where the perceived behavioral control is not realistic, e.g. when the individual lacks knowledge or information about the behavior, or when the individual is unaware that requirements or available resources have changed.

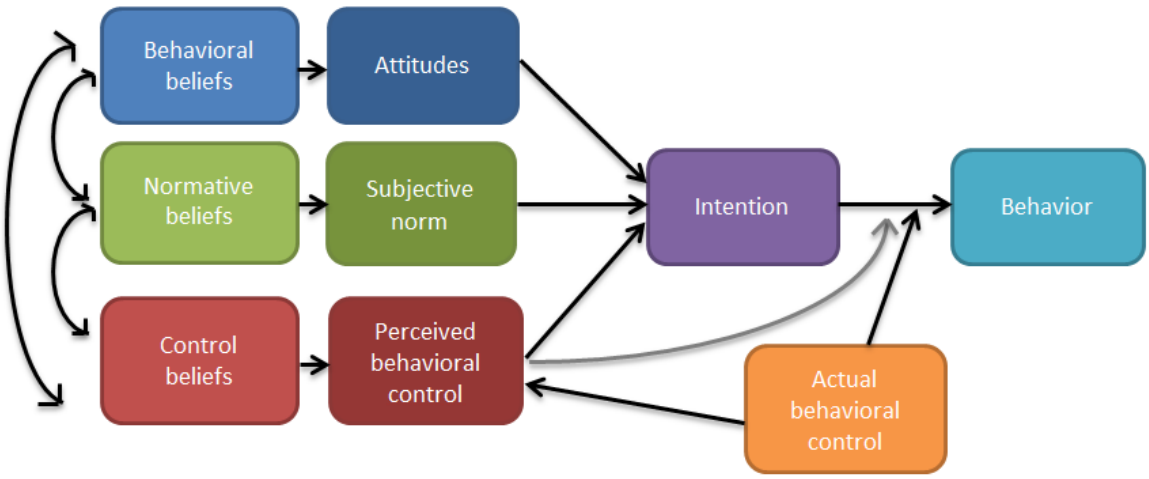

Figure 1. The theory of planned behavior. Different beliefs create attitudes, subjective norm, and perceived behavioral control, influencing intentions to carry out a behavior. Actual behavioral control decides whether or not the behavior is carried out. Perceived behavioral control can in some cases be used to substitute a measure of actual control, which is illustrated by the gray arrow. Modified from Ajzen (2002).

2.2.2 Application to this study

When the theory of planned behavior is applied to the specific settings in this study; the intention is the farmer's commitment to use organic methods, attitudes reflects the farmer's thoughts about organic methods, subjective norm is the influence of important others (family/neighbors/extension workers etc.) concerning which methods to use, and perceived behavioral control represents the perceived capability to successfully use organic methods. Depending on the amount of actual control, e.g. availability of organic manure, the farmer will then carry out the behavior, i.e. use organic methods.

2.3 Empirical findings – beliefs and factors influencing farmers' use of organic methods

Personal motivating beliefs affecting organic production have been researched (McCarthy et al, n.d.), but mainly in developed countries. Farmers' motivation for use of organic methods is arguably different in a developing country where producing enough food to support the own family is an apparent problem. Factors influencing farmers' decision are also likely to be different in developing countries, or at least the relative importance of different factors. This further emphasizes the importance of not simply applying results from other countries in decision making and policy creation, but investigating what motivations and other factors influence the Ugandan farmers. It can however be helpful to look at findings from other countries as these might give an idea of potential influential factors, so here follows a short summary of some of the studies in the field of farmers' motivations and decision making concerning organic versus conventional methods.

2.3.1 Previous research concerning farmers' use of different farming methods

Allen and Bernhardt (1995) claim that there is a relationship between production methods and world view, where specific attitudes are related to agricultural methods. Personal background,

education, access to knowledge, attachment to groups, and life events explain use of different farming methods among farmers (Kaltoft, 1999). Fairweather and Campbell (1996) explored farmers' decision making whether or not to grow organic products on New Zealand, and found the motivations for growing organic to be philosophy, consumer preference, personal health, high premiums, problems with conventional production, non-willingness to use chemicals, and concern for the soil. However, in many cases specific constraints prevented motivated farmers from using organic methods. Schoon and Te Grotenhuis (2000) report that a farmer's freedom of choice regarding use of different methods often is limited by factors like legislation, market changes and natural circumstances. Their study in the Netherlands show that personal values can sometimes be more important factors controlling choice of farming methods than economic considerations. Farmers can also be influenced by signals from society about whether or not a certain method is accepted. Gladwin (1989) investigated decisions amongst Malawi farmers concerning whether to use artificial fertilizers or organic fertilizers or both. Results showed that the farmers' lack of capital was a more important factor limiting the use of artificial fertilizer than was their indigenous beliefs in organic fertilizers. When certain conditions were met, like having enough animals to make manure, organic fertilizer was used, while when other conditions were met, like opportunity to buy artificial fertilizer, artificial fertilizer was used. It was concluded that farmers desired to use organic fertilizers, but also used artificial fertilizers when these were available.

2.3.2 The relevance of using the theory of planned behavior in a study like this

The theory of planned behavior has been used in other countries than Uganda to explore farmers' motivations to use organic methods. Hattam (2006) carried out a case study in Mexico and found that positive attitudes are not in themselves enough to induce use of organic methods. Social pressure and a perceived inability to successfully use the organic methods proved more important, showing that psychological factors can be significant barriers. It is therefore important to promote an enabling environment with focus on the farmers' ability to use organic methods (Hattam, 2006). A study on Ireland supported the theory that behavioral intention (to use organic methods) was influenced by attitude, social pressure and level of perceived behavioral control (McCarthy et al, n.d.). Wehinger et al (2002) chose to use the theory of planned behavior, when investigating adoption of organic farming practices in Germany, because of its inclusion of social norms as a factor forming behavioral intention. Toric (2005) lists advantages and disadvantages in using the theory of planned behavior in an agricultural context, and concludes that it provides a suitable theoretical framework when assessing factors that influence use of different methods. In an Australian study investigating farmers' decision making regarding sustainable land use management practices, Toric (2005) suggests that control factors probably are more influential than subjective norms for farmers making decisions related to land resources and environment. The subjective norm is more influential when behavioral beliefs (positive or negative attitude towards the behavior) are weak, i.e. if a farmer has limited knowledge about a method important others might have more influence over the farmer's decision to use the method or not. The farmer's behavioral beliefs, or attitudes, were most influential when there were concerns about profitability of the method.

2.4 Summary

This chapter has given a brief overview over different types of agriculture in Uganda and provided a description of what is meant by conventional and organic agriculture. A description of the two study areas explains the settings in which the study took place. The

literature review shows that previous studies focusing on farmers' decision making when it comes to organic contra conventional methods mainly have been carried out in developed countries. These studies indicate that many factors influence why farmers use, or do not use, certain methods. Arguably these factors can differ between developed and developing countries, emphasizing the importance of carrying out a study in Uganda to understand the conditions there. The theory of planned behavior explains behavior from the starting point of different beliefs and includes actual control over the behavior, and is therefore considered a suitable base to explore reasons for use and non-use of organic methods.

3. Methodology

3.1 The study

This thesis aims to, through a farmer's perspective; explore what preconditions and barriers there are to the use of organic alternatives for soil fertility management and crop protection in Uganda through understanding which methods are used today, and why the farmers use these specific methods. In order to obtain information an eight week field study was carried out in Uganda during February-March 2012. This chapter will explain the methods used for data collection and analysis. The chapter begins with an overview of the research design, thereafter follows a description of the respondents, methods for data analysis and presentation, and finally a discussion about limitations and sources of error.

3.2 Research design

This study is built upon a farmer's perspective. When looking at how other people perceive the situation, a qualitative approach for data collection that emphasizes the perspective of the people being studied is considered appropriate (Alvesson and Sköldberg, 2009). Interviews were chosen since they, according to Bernard (2005), are a good way to explore people's attitudes and values.

Face-to-face interviews were chosen over e.g. questionnaires, because concepts like "organic" are not always clearly defined and might mean different things to different people. Semi-structured, face-to-face interviews allow capturing these differences, and exploring farmers' thoughts about these issues and how it affects which methods they use. When the aim is to find out as much as possible about the farmers' thoughts and perceptions, an interview with open-ended questions encourages detailed answers and allows the respondent to bring up topics unthought-of by the interviewer. Despite being time consuming, face-to-face interviews are most appropriate for this type of lengthy surveys with open-ended questions (De Vaus, 2002). An interview guide with pre-decided questions sorted into different themes was used during the interviews, with the possibility to make up new questions and follow up emerging themes during the interview. This type of semi-structured interviews (Bernard, 2005) minimizes the risk that an important topic or theme is left out, and ensures that a fuller picture is covered. The limited time to conduct the study also made semi-structured interviews suitable.

The interview guide (appendix 1) was created based on the theory of planned behavior (described in chapter 2). Questions were designed to cover behavioral, normative and control beliefs, following guidelines described by Ajzen (2002). Demographic and additional open-ended questions were added, with inspiration from Toric (2005) and Lewis et al (2010). The interview guide was slightly modified after the first interviews, in terms of formulation of questions to make sure they were understood in a correct way by the respondents. Depending on their answers, different farmers were also asked different follow-up questions.

3.3 Selection of respondents

In total, 81 farmers were interviewed in two different areas in Uganda. 41 farmers were interviewed in Rakai district, of these were 14 organic and 27 were conventional farmers. 40 farmers were interviewed in Luweero district, of these were 31 organic and 9 were conventional farmers. The organic farmers in Rakai were all non-certified, while of the

organic farmers in Luweero were 21 certified as organic, 3 were in the process of becoming certified, and 7 were non-certified. The reason for choosing two different districts was to capture eventual differences in reasons behind use of organic methods that might occur between an area where an exporter offering premium prices for certified organic products is present (Luweero) and an area where no certification or export of organic products occur (Rakai). Organic farmers were interviewed to find out why some farmers use organic methods, and to see what challenges farmers using organic methods face today. Conventional farmers were interviewed to find out why some farmers do not use organic methods, and what possibilities or barriers they see to use of organic methods in the future. Farmers were selected with a combination of purposive and convenience sampling. Lists of farmers in the area known to use either organic or conventional methods were made, and the ones actually interviewed were those at home (and willing to participate) when visited. This strategy resulted in an uneven distribution between organic and conventional farmers in the two areas. Farmers with a varying degree of other responsibilities in the community were included, from local leaders to those without any responsibilities. Both male and female farmers were interviewed. In general, attempts were made to interview the head of the household since in most cases this also is the person deciding which farming methods to use. All farmers interviewed in this study could sell at least some surplus of the produce of the farm, i.e. none of them were pure subsistence farmers. Interviews were in most cases conducted on the farm, either in the house or in the garden. In some cases the farmer was found in another part of the village and was interviewed there. When possible, a transect walk (de Zeeuw and Wilbers, 2004) was made on the farm together with the farmer to get a better understanding of the system and the methods used.

Apart from farmers' interviews, information was collected from 3 governmental extension workers in Rakai district and a representative from an export company of organic produce in Luweero district. Since these persons were considered as important sources of additional information they were selected with purposive sampling. These interviews were less structured than the ones with farmers, and were used to gather information to fill in knowledge gaps and also as a sort of triangulation (de Zeeuw and Wilbers, 2004) where findings from farmer interviews were discussed to get an idea of the representativeness of the area. Information was also collected during participation in a farmers' group meeting in Luweero district. Due to practical constraints, no extension worker was interviewed in Luweero district.

Respondents were informed about the study, what the collected information was going to be used for, and they had the option of whether or not they wanted to participate. No names of the respondents were recorded during the interviews, since it was believed that this anonymity would allow them to speak more freely. A few interviews were conducted in English, but translators were present during all interviews to translate between the local language, Luganda, and English when needed. Since these translators had much knowledge within the area they also acted as key informants and helped to fill in information gaps.

3.4 Data analysis and presentation

A qualitative approach with semi-structured interviews, as used in this study, generates large amounts of qualitative data, and a way to encode this data is to use thematic analysis (Boyatzis, 1998). The data analysis started already during the data collection when main findings and thoughts were put down on paper after each day of interviews in the field, as recommended by Charmaz (2003). After the field study was completed, interesting objects for

the different research questions were identified and coded when going through the data, i.e. a descriptive summary of the answers was created. These codes were then sorted into different themes consisting of patterns found in the collected information, and an interpretation of the data was made.

Transparency is important when using thematic analysis, i.e. it has to be clear how the interpretation was reached (Auerbach and Silverstein, 2003). To ensure this, quotations from the interviews are included in the text, making it possible for the reader to check the validity between the raw data and the interpretation. Quotations are extra important to illustrate the respondents' opinions in this study, since it focuses on a farmer's perspective. Because most interviews were made through a translator, these quotations are not the respondent's direct words, but the translation from Luganda to English.

The data is presented as a combination of tables and quotations, depending on what is considered most suitable to display the findings. This is a qualitative study but some information is presented quantitatively, such as characteristics of the farmers and their farms.

3.5 Reliability, validity, limitations and sources of error

When conducting a qualitative study using interviews the result can be affected by confounding factors, making it difficult to see the cause of an observed phenomenon. An example is instrumentation confound which can be avoided by using an interview guide which facilitates that different respondents understand a question in the same way, thus generating qualitative data that is reliable and comparable, and increasing the validity of the study (Bernard, 2005).

Only the farmers themselves know the answers to questions about their opinions and attitudes, but in some cases when asked about availability of information, inputs or markets the farmers' perception might not always correspond with the real situation. Triangulation helps to increase the validity or trustworthiness of the data through cross checking of information by using different sources of information (de Zeeuw and Wilbers, 2004), and this was obtained by also talking to extension workers and a representative for an export company.

A limitation with interviews is the deference effect, i.e. respondents might answer what they think the interviewer wants to hear (Bernard, 2005). Attempts to avoid this were made by emphasizing that the important thing was the respondents' own opinion, and questions were phrased without implicating right or wrong to avoid leading questions.

The non-random method used to select respondents, and the fact that interviews were only carried out in two of Uganda's over 100 districts makes it impossible to claim the findings to be representative for Uganda as a whole. Guest et al (2006) recommends that the sample size is established inductively and that sampling should continue until saturation is reached, i.e. when new interviews do not add new information or themes. This occurred during the study, which implies that the sample is big enough to draw some conclusions that can be applicable.

Another limitation of this study is that it is designed to explore farmers' different beliefs, but not their relative importance. The qualitative study makes it to some degree possible to suggest that certain beliefs are more important than others, but a quantitative study using multiple regression analysis would be needed to verify the relative strength and importance of behavioral, normative and control beliefs (Toric, 2005).

Using a translator is a source of error, since misunderstandings can occur on many levels during the process. The translator might misunderstand the question and thus ask the respondent something else than was intended. The translator might also formulate the translation of the answer in a way that makes the researcher interpret it as something different than the respondent meant. Attempts were made to avoid these misunderstandings by discussing the questions and the overall research purpose with the translators. The translators used were known to many of the respondents, which might be beneficial if it makes the respondents relax, but can be negative if the respondents for some reasons do not want to give honest answers in the presence of the translator.

A risk with thematic analysis is that the person conducting the analysis attributes the own personal values, attitudes or opinions to the respondent whose answers are being analyzed. It is therefore important to consider researcher's projection as one of the major sources of error in thematic analysis (Boyatzis, 1998).

3.6 Summary

A qualitative approach, with semi-structured face-to-face interviews including open-ended questions was used to collect data during an eight week field study in Uganda. The interview guide was constructed with inspiration from the theory of planned behavior. 81 farmers, conventional and organic, were interviewed in two different districts. Information was also gathered from extension workers and representatives from an export company. A thematic analysis was used to analyze the collected data.

4. Results

This chapter will begin with a brief description of the interviewed farmers and their farms and thereafter, one by one, deal with the six research questions. Results will be presented in a combination of tables and relevant quotations. In the next chapter the results will be further analyzed.

4.1 The farmers

Of the total 81 farmers interviewed, 45 were organic and 36 were conventional. While 41 farmers were from Rakai district, 40 were from Luweero district. 28 of the interviewed farmers were women, 53 were men. More detailed data about the farmers and their farms can be found in table 1.

Table 1. This table shows some basic facts about the interviewed farmers and their farms.

	Type of farmer		
	Conventional	Organic non-certified	Organic certified*
Number of farmers	36	24	21
Women/Men	9/27	11/13	8/13
Average age	44.8	49.4	44.1
Average education (years of schooling)	11	7	7
Average household size	7.5	8.2	6.5
Average farm size (acres)	7.7	8.4	7.1
Number of farmers who owns the land	34	20	18
Number of farms with animals	27	23	20
Number of farms with natural habitats conserved (wetlands, forests etc.)	16	11	12
Number of farmers selling products to the export market	5	2	13
Number of farmers who have access to training/extension	31	19	21
Number of farmers who are members of farmers' group	27	18	21
Number or farmers who can access artificial inputs (but not necessarily afford them – they are available in area)	36	23	20

*The certified organic farmers were certified on a contract basis, with the export company organizing and paying for the certification.

4.2 Research question 1. What methods for soil fertility management and crop protection are used by the farmers in Uganda today?

Table 2 shows the methods farmers mentioned when they described how they handle soil fertility management on their farms. Methods used were very similar between the two districts, Rakai and Luweero.

Table 2. Methods used to manage soil fertility.

Method to manage soil fertility on farm	Conventional farmers*	Organic farmers**
Artificial fertilizer	30 (83%)	-
Animal manure	27 (75%)	32 (71%)
Mulching (grass, coffee husk, banana leaves, residues of maize, leftovers from banana beer production)	15 (42%)	25 (56%)
Compost manure	11 (31%)	17 (38%)
Soil & water conservation structures (terracing, trenches)	9 (25%)	16 (36%)
Planting trees	6 (17%)	11 (24%)
Fallow	2 (6%)	7 (16%)
Crop rotation (rotating seasonal crops that fix N)	-	9 (20%)
Intercropping with nitrogen fixating crops	-	7 (16%)
Proper weeding (if no weeds, nutrients can be used by crops)	-	4 (9%)
Nothing	-	2 (4%)

*Number of conventional farmers using the method, and percentage of conventional farmers using the method. n=36.

**Number of organic farmers using the method, and percentage of organic farmers using the method. Certified and non-certified organic farmers used the same methods and are displayed together in the same column as "organic farmers". n=45.

Table 3 shows the methods farmers mentioned when they described how they handle crop protection on their farms. Methods used were very similar between the two districts, Rakai and Luweero.

Table 3. Methods used to manage crop protection.

Method to manage crop protection on farm	Conventional farmers*	Organic farmers**
Chemicals	35 (97%)	-
Biorationals (mix of urine, ashes, herbs)	6 (17%)	26 (58%)
Traps	5 (14%)	9 (20%)
Weeding with hoe or hand	3 (8%)	22 (49%)
Mulching	3 (8%)	11 (24%)
Pruning (e.g. cut and remove infected parts)	2 (6%)	17 (38%)
Animals (cats, dogs etc. to chase away monkeys and birds)	1 (3%)	6 (13%)
Fences	1 (3%)	1 (2%)
Pick and burn insects	-	13 (29%)
Scouting	-	8 (18%)
Plants that trap diseases or keep away pests (e.g. napia grass, onions)	-	5 (11%)
Nothing	-	5 (11%)

*Number of conventional farmers using the method, and percentage of conventional farmers using the method. n=36.

**Number of organic farmers using the method, and percentage of organic farmers using the method. Certified and non-certified organic farmers used the same methods and are displayed together in the same column as "organic farmers". n=45.

4.3 Research question 2. What advantages and disadvantages do farmers in Uganda see with organic and conventional methods respectively?

Table 4 shows the advantages conventional and organic farmers in Uganda see with use of organic methods for soil fertility management and crop protection. Advantages mentioned were very similar between the two districts, Rakai and Luweero.

Table 4. Farmers' perceived advantages with use of organic methods.

Advantages with use of organic methods for soil fertility management and crop protection	**Conventional farmers***	**Organic farmers****
No negative health effects from spraying chemicals	22 (61%)	31 (69%)
Long lasting soil fertility	15 (42%)	32 (71%)
Healthy crops, no poison from chemicals	14 (39%)	26 (58%)
Good for environment	12 (33%)	27 (60%)
No expensive inputs	7 (19%)	22 (49%)
Improves soil structure, rain water remains within soil	7 (19%)	19 (42%)
High demand for organic products	6 (17%)	15 (33%)
Premium price for organic products	5 (14%)	17 (38%)
High yields	4 (11%)	15 (33%)
Micro-fauna in soil not disturbed	3 (8%)	11 (24%)
Do not kill good insects	2 (6%)	7 (16%)
Use of local material	-	9 (20%)
Use of local knowledge	-	7 (16%)
Satisfaction when looking at crops	-	4 (9%)
Circulation of nutrients, e.g. exchange between cow and banana	-	2 (4%)

*Number of conventional farmers mentioning the perceived advantage, and percentage of conventional farmers mentioning the perceived advantage. n=36.

**Number of organic farmers mentioning the perceived advantage, and percentage of organic farmers mentioning the perceived advantage. Certified and non-certified organic farmers are displayed together in the same column as "organic farmers". n=45.

Table 5 shows the disadvantages conventional and organic farmers in Uganda see with use of organic methods for soil fertility management and crop protection. Disadvantages mentioned were very similar between the two districts, Rakai and Luweero.

Table 5. Farmers' perceived disadvantages with use of organic methods.

Disadvantages with use of organic methods for soil fertility management and crop protection	**Conventional farmers***	**Organic farmers****
Labor intensive	26 (72%)	33 (73%)
Time consuming (prepare organic manure, biorationals etc.)	23 (64%)	29 (64%)
Difficult to get rid of weeds	19 (53%)	14 (31%)
Smaller yield	16 (44%)	-
Tiresome	12 (33%)	31 (69%)
Only for small-scale agriculture	12 (33%)	5 (11%)
Expensive (because time and labor consuming)	11 (31%)	2 (4%)
Difficult to control pests and diseases	9 (25%)	-
Lack of market for organic products (no premium price)	8 (22%)	11 (24%)
Application of organic manure/compost brings pests to crops	4 (11%)	2 (4%)
Nothing	2 (6%)	4 (9%)
Difficult to obtain enough organic manure	-	17 (38%)
Difficult to obtain enough material to mix biorationals	-	14 (31%)

*Number of conventional farmers mentioning the perceived disadvantage, and percentage of conventional farmers mentioning the perceived disadvantage. n=36.

**Number of organic farmers mentioning the perceived disadvantage, and percentage of organic farmers mentioning the perceived disadvantage. Certified and non-certified organic farmers are displayed together in the same column as "organic farmers". n=45.

Table 6 shows the advantages conventional and organic farmers in Uganda see with use of conventional methods for soil fertility management and crop protection. Advantages mentioned were very similar between the two districts, Rakai and Luweero.

Table 6. Farmers' perceived advantages with use of conventional methods.

Advantages with use of conventional methods for soil fertility management and crop protection	**Conventional farmers***	**Organic farmers****
Easy to apply (quick to spray chemicals)	21 (58%)	27 (60%)
Higher yields	17 (47%)	3 (7%)
Crops are free from pests and diseases	16 (44%)	2 (4%)
Profitable	14 (39%)	5 (11%)
Not time consuming	13 (36%)	17 (38%)
Methods gives result fast (soil fertility, eradication of pests)	11 (31%)	6 (13%)
Can use on large area of land	11 (31%)	4 (9%)
Easy to access (buy fertilizers and chemicals)	9 (25%)	-
Not labor demanding	8 (22%)	-
Not tiresome	7 (19%)	22 (49%)
Artificial fertilizer contains right proportions of different nutrients	7 (19%)	-
Cheap	4 (11%)	-
Easy to get rid of weeds, and they stay away for a longer time	-	11 (24%)
Nothing	-	4 (9%)

*Number of conventional farmers mentioning the perceived advantage, and percentage of conventional farmers mentioning the perceived advantage. n=36.

**Number of organic farmers mentioning the perceived advantage, and percentage of organic farmers mentioning the perceived advantage. Certified and non-certified organic farmers are displayed together in the same column as "organic farmers". n=45.

Table 7 shows the disadvantages conventional and organic farmers in Uganda see with use of conventional methods for soil fertility management and crop protection. Disadvantages mentioned were very similar between the two districts, Rakai and Luweero.

Table 7. Farmers' perceived disadvantages with use of conventional methods.

Disadvantages with use of conventional methods for soil fertility management and crop protection	**Conventional farmers***	**Organic farmers****
Health risk for producer (when spraying chemicals)	29 (81%)	36 (80%)
Health risk for consumer (chemicals on crops)	25 (69%)	34 (76%)
Bad for environment (chemicals)	17 (47%)	39 (87%)
Protective gear is expensive	15 (42%)	-
Lack of knowledge about application times and rates	11 (31%)	-
Artificial fertilizer has to be applied continuously (short-lived fertility)	7 (19%)	17 (38%)
Artificial inputs are not always available	6 (17%)	-
Expensive inputs	5 (14%)	29 (64%)
Nothing	4 (11%)	-
Destroys soil, makes it dry and infertile	3 (8%)	11 (24%)
Poor quality of crops	3 (8%)	7 (16%)
Makes climate bad	-	11 (24%)
Kills decomposers, micro-organisms and good bacteria	-	5 (11%)
If you use artificial fertilizer you waste the manure you get from your animals	-	5 (11%)

*Number of conventional farmers mentioning the perceived disadvantage, and percentage of conventional farmers mentioning the perceived disadvantage. n=36.

**Number of organic farmers mentioning the perceived disadvantage, and percentage of organic farmers mentioning the perceived disadvantage. Certified and non-certified organic farmers are displayed together in the same column as "organic farmers". n=45.

4.4 Research question 3. Why, or why not, are organic methods for soil fertility management and crop protection used by farmers in Uganda?

According to the theory of planned behavior (Ajzen, 1991), our intention to carry out a certain behavior is influenced by a set of beliefs; forming attitudes, perceived social pressure and perceived behavioral control. Whether or not the behavior is actually carried out is also influenced by the amount of actual control the individual has over the behavior. This section will present Ugandan farmers' behavioral, normative, and control beliefs influencing their intentions to use organic methods for soil fertility management and crop protection, as well as the actual control factors limiting their choice of options on what methods to use, in an attempt to answer why, or why not, organic methods are being used.

4.4.1 Behavioral beliefs → attitudes

Advantages and disadvantages with use of organic methods (and conventional methods) are brought up in depth in research question 2, here they are grouped into three themes (economic, environmental, and social/health) to show how behavioral beliefs/attitudes influence farmers' intentions to use organic methods.

4.4.1.1 Economic

Beliefs about the economic performance of a method were shown to be very important in creating positive or negative attitudes towards the method and influencing the intention to use it. A majority of the conventional farmers in the study believed that using conventional methods is most profitable, while most of the organic farmers believed that using organic methods is most profitable.

"*When you use conventional methods you can farm on a larger area, get a higher yield and more profit*." Conventional farmer Luweero, male 30 years.

"*You make more money with conventional, because you use a mixture of organic and artificial methods and you get a higher yield*." Conventional farmer Rakai, male 35 years.

"*Organic methods are more profitable because you don't need to spend so much money on expensive chemicals, the inputs are cheap.*" Organic farmer Luweero, male 81 years.

"*Organic is more profitable. When I sell a bunch of my bananas I get 3000 Ugandan shillings, if it was conventional bananas I would only get 1500 shillings for a bunch*." Organic farmer Rakai, female 47 years.

A few of the organic farmers believed that using conventional methods is most profitable.

"*When you use conventional methods and apply chemicals you can easy clear a large area from weed and you can grow more crops. Then you get more profit*." Organic farmer Rakai, male 76 years.

A few of the conventional farmers believed that using organic methods is most profitable.

"*Organic methods are more profitable, there's no need of putting in money, you can collect the material you need locally. I use animal manure, but when I don't have enough I have to buy artificial fertilizer*." Conventional farmer Rakai, female 55 years.

4.4.1.2 Environmental

All farmers interviewed in this study, conventional and organic, believed that using organic methods is better for the environment.

"*I think organic methods are better for the environment. It adds more soil fertility. And when you spray chemicals some of it disappears as mist and pollutes the nature around*." Conventional farmer Rakai, male 28 years.

"*With organic methods you use nature to manage the crops. Then nature can manage nature*." Conventional farmer Rakai, male 32 years.

"*Chemicals destroy soil fertility. They kill earthworms and good bacteria, and cause soil compaction*." Certified organic farmer Luweero, male 40 years.

4.4.1.3 Social/health

All farmers interviewed in this study, conventional and organic, believed that using organic methods is better for human health. The believed health benefits with using organic methods are mainly connected to the non-use of chemicals, i.e. the farmer does not get in contact with

chemicals during the production, and the consumer of the product does not risk eating chemical residues.

"*I prefer organic crops, because crops produced with conventional methods I don't know if they have dangerous chemicals on them*." Conventional farmer Rakai, female 46 years.

"*Organic methods are healthier. You can eat organic fruits without washing them. They have no chemicals on them*." Organic farmer Rakai, female 47 years.

"*Crops produced with organic methods don't give you diseases. Chemicals can give you cancer*." Certified organic farmer Luweero, male 48 years.

Several conventional farmers said that they apply chemicals on the crops they are going to sell, but on the crops intended for home consumption they only use organic methods.

"*Organic is healthier. I don't use chemicals in my banana plantation because the bananas are for home consumption. After application of chemicals I feel uncomfortable, so I think: 'what about eating it then, how would I feel?'*." Conventional farmer Rakai, male 37 years.

4.4.2 Normative beliefs → perceived social pressure

Another factor influencing behavioral intention is the perceived social pressure, i.e. the influence of important others concerning which methods to use. Several "important others" were found to, to some extent, influence the Ugandan farmers' decision making.

4.4.2.1 Neighbors and other farmers

Some farmers using organic methods felt that their neighbors expect them to continue to use organic methods, or otherwise it will be seen as a failure. Because they do not wish to be seen as having failed this will act as a type of pressure on them and influence their intentions to continue to use organic methods.

"*If I changed to conventional methods my conventional neighbors would get comfortable because they would feel that I failed and adapted to their way of farming*." Organic farmer Rakai, male 56 years.

Some farmers felt that they should use organic methods because their neighbors do, and the neighbors do not like having someone using conventional methods so close to their farm because of fear that artificial inputs will end up there.

"*My neighbors are not happy, they think chemicals are bad and think it ends up in their gardens. We use very little chemicals because of this*." Conventional farmer Rakai, female 71 years.

For those farmers who are members in a farmers' group, opinions of other farmers can have large influence over the intentions to use, mainly, organic methods. Some groups are for organic farmers only, and some farmers said that they would let the other group members down if they would start to use conventional methods instead. Being a member of an organic farmers' group thus creates an incentive to continue to use organic methods.

"*The organic association would feel badly if I started to use artificial inputs, they would even curse me. I'm their leader; I have influenced them to be organic*." Organic farmer Rakai, male 56 years.

The farmers' group is also an important source of information about different methods for the farmers, and many of them see it as important to follow the advice they are given in the groups.

"*It is better for the health to use organic methods, you use no poison. I was told so by teachers from the farmers' group*." Organic farmer Luweero, female 50 years.

"*Advice from teachers in the group is important*." Certified organic farmer Luweero, male 48 years.

4.4.2.2 Extension workers and export companies

Extension workers are also important influence. Many farmers, conventional as well as organic, talked about the importance of getting and following advice from extension workers.

"*When I get a problem with pests on my crops I ask the local extension officer what I should do about it. Getting information from him is important*." Conventional farmer Rakai, male 39 years.

Certified organic farmers in Luweero district, where several organic export companies are present, also talked about the importance of advice and information from the export company. Some of these farmers explicitly said that an export company had convinced them to convert from using conventional methods to using only organic methods and become certified organic farmers, showing the great influence exporters can have over which methods farmers use. For these certified organic farmers, the export company had taken over the role of extension workers as the most important source of information and advice.

"*Organic crops are better and healthier. I've heard it from [export company], and from other farmers. That's why I use organic methods*." Certified organic farmer Luweero, female 45 years.

"*I stopped using chemicals because teachers from [export company] told me I would get higher price for organic. But today we struggle to survive. If I don't get higher price soon I might start to use chemicals again*." Certified organic farmer Luweero, male 48 years.

Once the farmers are certified as organic farmers, the export company expects them to continue to use organic methods. They are important influence, since their assurance that they would provide a market with premium prices for organic products made several conventional farmers change to organic methods. Many of these farmers are not satisfied with the situation today, but they said that they continue to use organic methods because they have been assured that the market demand for organic products will increase, proving that the export companies still have big influence.

4.4.2.3 Radio and media campaigns

Influence also comes from radio commercials and campaigns promoting organic farming, making some farmers feel that society expects them to use organic methods. However, there

are also commercials about artificial inputs, influencing some farmers to use conventional methods.

"*Neighbors who don't use organic today lack knowledge about it. They hear adverts on the radio about chemicals and use it without enough knowledge about it*." Organic farmer Rakai, female 44 years.

Sometimes the advertisement for artificial inputs comes directly before or after the programs promoting organic methods, and this type of double message might cancel each other out.

"*Conventional methods are bad, we've heard it from workshops in the farmers' group. On the radio they say 'you should use organic methods', but then after these programs comes other that advertise chemicals. In the end you decide what to use, you try and see what happens*." Organic farmer Rakai, male 49 years.

4.4.3 Control beliefs → perceived behavioral control

The perceived behavioral control can be explained as the farmer's perception of how easy or difficult it will be to carry out a behavior, in this case the use of organic methods. Farmers who think that they easily can use organic methods in a successful way are more likely to intend to use organic methods.

4.4.3.1 Production

Some conventional farmers in the study believed that they cannot produce enough food or earn enough money to support their families if they use organic methods. Organic farmers on the other hand were more confident that they can use organic methods and successfully support their families.

"*I don't like to use chemicals but as it is today I don't have a choice. Without them my crops would be destroyed and my children would be hungry*." Conventional farmer Luweero, female 37 years.

4.4.3.2 Access to material

Some farmers believed that it will be very difficult to use only organic methods because they feel that they cannot access enough organic material. Other farmers felt that they can easily access all the material necessary to use organic methods. Some farmers believed that they cannot access artificial inputs.

"*I use organic methods for soil fertility because I have access to animal manure*." Organic farmer Rakai, female 46 years.

"*I sometimes use artificial fertilizers because I can't get enough organic manure from my animals and it's more expensive to buy*." Conventional farmer Rakai, male 51 years.

4.4.3.3 Availability of time and labor

Some farmers believed that organic methods are too labor demanding, time consuming and tiresome, and that they would not have the time necessary to successfully carry them out.

"*Organic methods are time consuming and tiresome. I need more time if I were to use them*." Conventional farmer Rakai, female 42 years.

"*I mostly use artificial because organic takes a lot of time and it's difficult to get big yields*." Conventional farmer Rakai, male 29 years.

"*I'm tired, and spraying chemicals is easier. Pesticides are not expensive*." Conventional farmer Rakai, female 38 years.

4.4.3.4 Knowledge

Some farmers believed that they do not have enough knowledge about organic methods to use them successfully. It is mainly when it comes to crop protection the farmers felt they lack knowledge on how to prepare biorationals to protect their crops from pests and diseases. Some farmers said that they would like more knowledge about using conventional methods, but none of the farmers said that lack of knowledge stopped them from using these methods.

"*I use chemicals because I have no training about other options. It's the only option I have today.*" Conventional farmer Rakai, male 70 years.

"*I would like to use organic methods, but I need knowledge*." Conventional farmer Luweero, male 53 years.

"*I need more knowledge. How I can apply method of organic and crops growing well without being affected by pests. If I had this knowledge I could use organic methods only*." Conventional farmer Rakai, male 37 years.

4.4.4 Actual control

The main actual control factor limiting farmers to carry out their intended behavior, i.e. using organic methods, was access to material. Some farmers whose intentions were to use organic methods were limited by availability and affordability of organic material or the manual labor needed to carry out the methods. Other farmers whose intentions were to use conventional methods were limited by the availability and affordability of artificial inputs.

4.5 Research question 4. What methods would the farmers in Uganda prefer to use if they could choose freely without being limited by external factors?

4.5.1 Conventional farmers

Conventional farmers today use a combination of conventional and organic methods to manage soil fertility and crop protection on their farms. A majority of the conventional farmers interviewed in this study expressed a wish to only use organic methods. Their main reason for wanting to use only organic methods was a concern that using chemicals is harmful for human health and for the environment.

"*I have to use chemicals today. But I'm worried about health effects. I would use organic alternatives if I could*." Conventional farmer Rakai, female 48 years.

However, these farmers said that they can only use organic methods to a limited extent, and have to also use conventional methods, i.e. artificial inputs, because of:

- Limited access of organic material
- Organic methods are too time consuming

- Organic methods are too labor demanding
- Profit would be too low if only organic methods were used (because according to these farmers; organic methods are so time consuming and labor demanding they can only be used to farm a smaller area of land, the harvest will then be lower, and there is not enough market with premium prices for organic products that compensate this)

"*It is difficult to grow organic here. We have simple hoes and it's hard to till the land. Labor is costly and we use chemicals to kill grass to be able to plant. I would like to use organic methods, but I don't have enough money to pay for labor*." Conventional farmer Rakai, male 76 years.

4.5.2 Organic farmers

The majority of the organic farmers interviewed in this study said that they prefer to use organic methods because they give good and healthy crops, have no negative side-effects and are good for the environment. A few of the organic farmers (none of the certified organic farmers) expressed a wish to use conventional methods, i.e. use artificial inputs, because:

- They think it improves soil fertility
- They believe it would reduce their problems with pests and diseases
- It is seen as a fast and easy method, spraying chemicals is not as time- and labor consuming as e.g. weeding by hand or hoe

"*My crops don't look well, I want to spray with chemicals to get better-looking crops*." Organic farmer Luweero, female 43 years.

"*Soil fertility on my farm is not so good, I want to use artificial fertilizer to improve it. I think it is better than using organic manure*." Organic farmer Luweero, female 22 years.

However, these farmers said that they are limited to only using organic methods, because:

- Artificial inputs are not available, they cannot access them
- Artificial inputs are too expensive, they cannot afford them

"*I have never used artificial inputs, but I would like to if I could afford them. Especially herbicides, it makes work easier*." Organic farmer Rakai, female 56 years.

4.6 Research question 5. What would make Ugandan farmers today using conventional methods switch to organic methods?

Almost all conventional farmers in this study said that they are satisfied with the methods they use for soil fertility management and crop protection (i.e. they think the methods they use work good, that soil fertility is good and that pests and diseases are not a big problem on the farm). A few of the farmers said that there is nothing that would make them start to use only organic methods. They do not believe that they could be successful farmers without the use of artificial inputs, that harvests would be too low, and that they would not be able to support their families. However, a majority of the conventional farmers in the study would prefer to use only organic methods due to concerns for the own health and the environment. As mentioned briefly under research question 4, there are however factors, acting as barriers to the use of organic methods, that still make them use conventional methods. This section brings up what would make conventional farmers stop the use of artificial inputs and only use organic methods for soil fertility management and crop protection.

4.6.1 Money

Financial matters were brought up by many conventional farmers as a barrier to the use of organic methods. These farmers believed that they could not make profit/get enough income today if they used organic methods. Several farmers mentioned that they believe that organic methods are too costly today, but that they would use them if they got support in some way. Government subsidies were one suggestion.

"*If government subsidized organic, gave materials to cheap prices, I could change to organic way of farming*." Conventional farmer Rakai, male 29 years.

Other farmers said that they would start to use only organic methods if artificial inputs became too expensive. They did not necessarily see organic methods as too expensive, but rather saw conventional methods as such a cheap option that they used them because of this.

4.6.2 Time and labor

The use of organic methods is considered by the farmers to be very time consuming compared to the use of conventional methods. Preparing organic manure/compost, and collecting all the material for mixing biorationals takes time, and many farmers prefer to use artificial fertilizer and chemicals instead, because these you buy ready in a store and just apply on your land. Several conventional farmers said that they would use only organic methods if they had the time for it.

"*If I had time for organic methods I would use them. But clearing a large area from weeds with a hoe takes too long time*." Conventional farmer Rakai, male 45 years.

While manual organic methods for e.g. weeding are seen as too labor demanding, some farmers said that if they had tractors it would be easy to use organic methods on a larger scale, because then they would not have to use hoes and weeding would be easier so they would be able to clear and farm on a larger area of land.

"*I would like to clear a part of land but can't do the work myself. If I had a tractor it would be easy to go organic, could use tractor to kill grass instead of chemicals*." Conventional farmer Rakai, male 76 years.

4.6.3 Market

Some farmers said that they would use only organic methods if there was a higher market demand for organic products, or if the market gave a better price for organic products. They meant that this could compensate for the smaller harvest when using organic methods (due to farming on a smaller area of land because the methods are more time consuming and labor demanding), and make it possible for them to earn enough money.

"*I would use organic methods if there was a market demand for organic products. If the market gives a better price for organic*." Conventional farmer Luweero, female 49 years.

4.6.4 Access to organic material

Some conventional farmers said that they would use only organic methods if they could access enough organic material. If you do not have animals it can be difficult or expensive to access organic manure, and even if you have animals it can be difficult to get as much manure you need. Also access the different ingredients needed to mix biorationals can be difficult and

expensive, making many farmers choosing to use chemicals instead. Access to enough organic material was given by many conventional farmers as the major barrier to use of only organic methods.

"*I can't access enough animal manure today. If I had more animals I would get enough manure and then I would not need to use artificial*." Conventional farmer Rakai, male 56 years.

4.6.5 Health

As mentioned before there are strong concerns among the farmers regarding chemicals and harmful health effects. Spraying chemicals is considered as spreading poison, which might harm a person both when applying the chemical in the field and when eating a crop that might have chemical residues. Lack of protective gear when spraying is a problem and several farmers reported that they feel dizziness and nausea after applying chemicals in their fields. Some of the conventional farmers said that they consider to switch to only organic methods because of concerns for the own and the family's health.

"*You have to use protective gear when you spray chemicals, it adds on the expenses. If you're not protected it can be dangerous, it can harm your skin. The fear that I can get poisoned by chemicals could make me abandon conventional methods*." Conventional farmer Rakai, female 55 years.

4.6.6 Knowledge

The feeling that one lacks knowledge about the use of certain methods can also act as a barrier. Some of the conventional farmers said that they would use only organic methods if they had more knowledge about them.

"*If I had knowledge about controlling pests organically*." Conventional farmer Rakai, male 32 years.

4.7 Research question 6. What would make Ugandan farmers today using organic methods switch to conventional methods?

This research question aims at exploring what concrete things that might make organic farmers start to use conventional methods. By pointing out these, preventive measures can be taken to facilitate for these farmers to continue to use organic methods. Most of the organic farmers said that they are satisfied with the methods they use for soil fertility management and crop protection (i.e. they think the methods they use work good, that soil fertility is good and that pests and diseases are not a big problem on the farm). Very few would like to switch to conventional methods, those who would say they would do so if they could access and afford artificial inputs. These farmers could be called "organic by default", as is brought up in the frame of reference. A majority of the organic farmers said that there is nothing that would make them change to use of conventional methods. They only saw negative aspects with use of conventional methods, e.g. that they destroy the environment and are bad for the human health. They believe that there is no market demand for crops that have been grown with the use of chemicals, and they want to continue to use organic methods. Some of them however see things that might force them to change to conventional methods.

4.7.1 Market and money

Some organic farmers in the study felt that they do not get enough money for their organic products in relation to the time and amount of work they have used to produce them. They said that if they do not get a higher price for their organic products they might change to conventional methods, as they believe it is easier to make profit using conventional methods. Several organic farmers expressed a concern about the market for organic products. If there is not a high market demand for organic products, with a premium price, some of the farmers said that it will be hard for them to earn enough money to support their families, and that this might force them to use conventional methods. By using conventional methods they believe that they can farm a larger area of land, get a bigger harvest, and thus earn more money.

"*If the market price for organic products is too low I can't make profit and then I might have to change to conventional methods*." Certified organic farmer Luweero, female 40 years.

"*If there is no market for organic products, if I have to sell my crops at the same market as conventional products – and to the same price – then I might change to less tiresome conventional methods*." Organic farmer Rakai, male 56 years.

The concern about a market for organic products was especially high among the certified organic farmers in Luweero district. These certified organic farmers have contracts with export companies that buy their products, to a higher price than what is paid on the local market, and then sell the products to countries in Europe or North America. The problem reported by many of the farmers is that these export companies only collect a small part of the harvest from each farmer, leaving the farmer with a large part of the harvest that has to be sold at the local market. On the local market they do not get more money for the organic products than the market price for conventional products, and the premium price they get for the small part of the harvest they sell as certified organic products to the export company is not high enough to compensate for this, considering the higher cost for the farmer (time and labor put in in relation to harvest output) to produce organic products.

4.7.2 Labor

Some organic farmers said that lack of labor might force them to change to conventional methods, which are seen as less labor demanding. Many organic methods involve hard and tiresome manual labor, and this can be difficult for older farmers, who are left with the choice of hiring in (expensive) workers to their farm, or start to use easier and less tiresome conventional methods like spraying chemicals.

"*If I can't get enough labor for weeding the garden I might use chemicals instead. Labor is expensive here now, young people don't want to do hard work like weeding with a hoe. Chemicals are easy to use and cheap if you compare.*" Organic farmer Luweero, male 52 years.

"*Using organic methods is hard work. You have to use your hands and a hoe. It was not a problem when I and my wife were young but now when we're old it's too tiresome for us*." Organic farmer Rakai, male 74 years.

4.7.3 Access to organic material

Just like the conventional farmers, the organic farmers in the study were concerned with obtaining enough organic material to use organic methods for soil fertility management and

crop protection. They said that if they cannot access enough organic manure and materials to mix biorationals they would have to use artificial inputs, i.e. conventional methods instead.

"*If I couldn't access enough organic material, like manure and biorationals, I would have to use conventional methods instead*." Organic farmer Rakai, male 36 years.

"*It is difficult to get enough organic manure when you get older. I can't take care of so many animals anymore, before I had all the organic manure I needed from my cattle, now I have to try to get it from neighbors*." Organic farmer Rakai, male 70 years.

4.7.4 New pests and diseases

Some organic farmers were concerned that new pests and diseases might force them to use conventional methods, i.e. chemicals for crop protection. They feared that the biological control and biorationals they use today might not be enough in the future. A few of them reported that already today there are pests that they do not know how to get rid of with organic methods.

"*If a new pest or disease show up that I can't control with organic methods, I might have to spray with chemicals even though I don't want to use them. But I have to produce food, I have to support my family*." Organic farmer Rakai, female 60 years.

4.7.5 Knowledge/beliefs

A change in knowledge, or change in beliefs might make organic farmers start to use conventional methods. Advice from people considered as important inspiration (extension workers, staff at workshops, experts from export companies) can also, according to the farmers, influence them to change methods.

"*I would change to conventional methods if I thought that they were better. But from what I know today organic methods are better for the health and for the environment*." Organic farmer Luweero, female 50 years.

"*If I saw that someone using chemicals getting much higher yields than me I would consider to change to conventional methods*." Certified organic farmer Luweero, male 35 years.

"*If those who taught me to use organic methods tell me to use chemicals I would do as they say*." Certified organic farmer Luweero, male 65 years.

5. Analysis

In this chapter the results presented in the previous chapter will be analyzed, with a focus on preconditions for, and barriers to, use of organic methods for soil fertility management and crop protection.

5.1 Research question 1. What methods for soil fertility management and crop protection are used by the farmers in Uganda today?

Tables 2 and 3 in the result chapter show that farmers in Uganda use a wide range of different methods to manage both soil fertility and crop protection on their farms. Even though not all methods are used by all farmers, most of the farmers use a combination of several methods. The conventional farmers also use a large variation of methods; they do not only use conventional methods (artificial inputs like artificial fertilizer and chemicals) but also combine them with organic methods. One of their reasons for using a combination of conventional and organic methods is that they believe these methods to complement each other and that best result will be achieved by using both. Another reason for combining them is that they do not always have enough resources to use only conventional or only organic inputs. Most of the organic methods are also used by conventional farmers. Only organic farmers mentioned that they use intercropping with nitrogen fixating crops and crop rotation when they were asked how they manage soil fertility. Even though several of the conventional farmers also use these methods, they might not associate them with soil fertility management – or they might not consider them of great importance, and therefore did not mention them here.

When it comes to crop protection the organic farmers use manual methods, like weeding with a hoe and picking away insects by hand, and some of them mix their own biorationals and spray. They see this as a constant, never-ending work, using expressions like "*You have to look after the garden, take care of it*", or "*You have to keep your garden clean*". Conventional farmers either combine these methods with spraying chemicals (herbicides, pesticides, insecticides), or use only chemicals.

Some of the organic farmers said that they do "nothing" to manage soil fertility or crop protection on their farms and should then, according to Scialabba (2000) not be defined as organic (see section about traditional and "organic by default" farmers in chapter 2). Some of the farmers doing "nothing" to manage soil fertility and crop protection said that they did not have any problems with pests or diseases and that soil fertility was so good on their farm so they did not have to do anything. They might qualify as organic according to complying to the standards set up for certification since these mainly concerns non-use of artificial inputs, but they do not qualify as organic according to the general principles saying that organic farmers should always work to e.g. maintain soil fertility.

5.2 Research question 2. What advantages and disadvantages do farmers in Uganda see with organic and conventional methods respectively?

As shown in tables 4-7 in the result chapter, farmers in Uganda have very varying beliefs about advantages and disadvantages with organic and conventional methods for soil fertility management and crop protection. What is seen as an advantage by one farmer might be seen as a disadvantage by another, depending on how they perceive the situation.

5.2.1 Environment

Both conventional and organic farmers agree that an advantage with the use of organic methods is that it is better for the environment than is use of conventional methods. The use of chemicals is thought to be harmful for the environment in several ways. Application of organic manure is seen as having the advantage of making soil fertility last long. Application of artificial fertilizer is seen as having the advantage of immediately boosting soil fertility, but at the same time have the disadvantage of this soil fertility being short-lived. Another advantage mentioned with use of organic manure is that it improves the soil structure and helps to retain rain water in the soil, which is of high importance during the dry periods, and becoming increasingly important with the changing climate. When it comes to the environment, what the farmers mention as an advantage with organic methods often has its corresponding disadvantage with conventional methods. This is the case for beneficial soil organisms and insects, which are believed being damaged by the use of conventional methods, but unaffected (or affected in a positive way) by the use of organic methods.

5.2.2 Health

Health related issues are brought up by both conventional and organic farmers, and they see advantages with use of organic methods and disadvantages with use of conventional methods. It is believed that the use of chemicals can cause serious diseases like cancer. Problems can occur on two levels. The producer might be affected by the chemical when spraying it, due to lack of knowledge on how to handle the chemical, or due to insufficient use of protective gear. Protective gear is expensive in Uganda, and many farmers say that they cannot afford it even though they are aware of the risks of not using it. Also the consumer can be affected by residues of chemicals on the crops, and some consider crops produced with conventional methods to be poisonous and harmful.

5.2.3 Obtaining materials/inputs

A disadvantage with both organic and conventional methods mentioned by the farmers is that it can be difficult to obtain enough materials or inputs. Artificial inputs might not always be available, or the farmer might not always have enough money to purchase them. Organic materials might also not always be available in sufficiently large quantities, forcing some farmers to use conventional methods instead (these farmers could then be called "conventional by default"), or do nothing at all. Unavailability of enough organic material is a big problem that needs to be addressed if the use of organic methods is going to be expanded.

Most of the organic farmers say that they cannot buy biorationals but are dependent on finding the ingredients and mixing it themselves. Not only is this time consuming, which is also brought up as a disadvantage, but it also increases the uncertainty of whether or not the farmer will be able to protect the crops against pests and diseases. If biorationals were ready available to purchase from agro-shops this could facilitate the use of organic methods and make them less time consuming and labor demanding. On the other hand this would mean that the farmers need cash to purchase the biorationals instead of just collecting the materials themselves on their farm and in the surrounding nature, and cash constraints is also a large issue for these smallholder farmers. In addition, organic methods are often promoted as suitable for smallholders in developing countries because of being based on the use of local available material, meaning that the farmers do not need to purchase expensive inputs. It is clear that there is no easy solution to this situation.

The most common way to obtain organic manure to manage soil fertility is to keep animals. This however requires the farmer to have enough land where the animals can graze, or where

feed can be collected or produced. Shortage of land and fragmentation of farms when divided between siblings creates a problem. Keeping animals also require large amounts of water, a resource that is scarce in many areas. Climate change has prolonged the dry periods, and many farmers experience lack of water as a big issue on their farms. This can make obtaining enough material to use organic methods for soil fertility management and crop protection an even bigger problem in the future if not properly addressed in time.

5.2.4 Knowledge

A disadvantage with the use of chemicals mentioned by some of the conventional farmers is that not all farmers know when and how to apply chemicals. This lack of knowledge is not only a health risk for the farmers themselves, but it also means that crop growth might not be optimum and that there is a risk that chemicals end up causing problems in the surrounding environment. Farmers are supposed to get information on how and when to use chemicals when they buy them in an agro-shop, but many farmers say that this information is not enough and that they feel they need to know more about chemicals to use them in a safe way. In Uganda, retailers of agro-chemicals have to complete a certification training and be licensed to sell chemicals, however PSFU (2006) reports that only 142 of 1675 agro-shop owners selling chemicals have gone through the training and obtained the license. Arguably, a majority of the agro-shop owners do not have enough knowledge to pass on to their customers on how to use chemicals safely.

An advantage with the use of organic methods mentioned by some of the organic farmers is that they can use their local knowledge. While they see use of artificial fertilizers and chemicals as something that necessitates the obtaining of new knowledge, much knowledge on how to use organic methods have been passed down for generations (implicating that the traditional farming methods used in the area shares many similarities with organic methods). This feeling of empowerment can be important for successful farming as it increases the belief in the own capabilities.

5.2.5 Yield and profitability

Some of the farmers think that organic methods give higher yields, others believe that conventional methods give higher yields. Opinions on which methods that are most profitable also differ. Some farmers say that an advantage with use of organic methods compared to conventional methods is that you do not need to purchase expensive inputs, and the use of organic methods is therefore more profitable. Others mean that organic methods are so time- and labor consuming (e.g. weeding by hand or hoe) that you can only use them on a smaller area of land, thus get a lower yield, and the profit will be lower even if you manage to obtain a premium price for the organic products. Some organic farmers believe conventional methods are more profitable, because these can be used to farm a larger area of land, thus produce more, at the same time as the market price of organic and conventional products is the same.

In general, conventional farmers think organic methods are expensive because they are time and labor consuming while organic farmers think they are cheap because they can use local material and their own knowledge. The own beliefs of what is cheap and what is expensive decides what is seen as an advantage or a disadvantage here.

5.2.6 Access to market and premium price

Some organic farmers bring up premium price for organic products as an advantage, while other organic farmers mention lack of markets with premium prices for organic products as a

disadvantage. This shows that the situation differs between farmers, even within the same area. There is no "official" local market for organic products where the farmers can obtain a premium price (except in Kampala, but to transport their products there is too expensive for the majority of these farmers), but some farmers with the right contacts or connections can still sell their organic products to a premium price.

"*People I correspond with are interested in organic products, they know it's healthy. I sell my products to priests, hospital managers, health centers, schools, well-off people. They pay me more for organic products*." Organic farmer Rakai, male 67 years.

"*In rural areas there's no price difference, people don't select between organic and conventional. In cities organic can earn more money on less quantities because there is a price difference*." Conventional farmer Rakai, male 64 years.

It is difficult, in most cases impossible, for individual farmers to access the export market for organic products. Costs for certification would be too high for an individual farmer, the most common today is that an export company contracts farmers and organize the certification for them as a group. Organic export companies are not present in all districts in Uganda, e.g. there were none in Rakai during the time of this study, making it even harder for organic farmers there to find a market.

Also some of the certified organic farmers, contracted to export-companies in Luweero, experience lack of market as a disadvantage with using organic methods, because the export company do not buy all of their harvest, and they have to struggle to find a good price for the rest on the local market.

5.3 Research question 3. Why, or why not, are organic methods for soil fertility management and crop protection used by farmers in Uganda?

5.3.1 Economic aspects have higher influence than environmental or social

Both conventional and organic farmers believe that organic methods are better for the environment and for human health. The fact that conventional farmers still use conventional methods shows that these beliefs are not the most important ones influencing their decision making. Even though they create positive attitudes towards the use of organic methods, it might not in all cases be enough to form an intention to use organic methods.

Most farmers state that they think environmental conservation is important. Many of them say that the climate has become worse with longer dry periods, and that this is caused by deforestation and using wetlands as agricultural land. Both conventional and organic farmers show an interest in protecting the environment, and report that they among other things plant trees to compensate for previous deforestation and to improve climate. A general interest in conserving environment is thus not necessarily the decisive factor for use of only organic methods, since this environmental interest is shared by both organic and conventional farmers.

The economic aspect is very important when it comes to behavioral beliefs. It is interesting that many farmers, conventional as well as organic, believe that the methods they use themselves are the most profitable. This suggests that beliefs about profitability are important,

shaping attitudes, and might be more influential over intentions to use a method than is beliefs about impact on environment and health.

Some of the conventional farmers used chemicals on the crops they were going to sell to increase the output, but not on the crops intended for home consumption. This shows that concerns about health were most influential when producing for the family, and the importance of getting a large output affected behavioral intention most when producing cash crops for sale. In Uganda in general, chemicals are mostly used on cash crops (Walaga and Hauser, 2005) to increase production and be able to sell more crops.

Organic farmers thinking that conventional is a more profitable production method might prioritize health and environment over economy, if they feel that they still earn enough to support their families using organic methods. This control belief (perceived behavioral control) that one is able to successfully carry out the methods is important.

5.3.2 Influence of important others

Many farmers, both organic and conventional, mentioned governmental extension workers as important influence over which methods they use and whose advice they follow. If the governmental extension worker promotes use of organic or conventional methods, or a combination, varies on personal beliefs of what is the best method. The extension workers interviewed for this study all had somewhat different advice for the farmers whether or not to use artificial inputs. Coming from the same extension service (in this case the governmental) it could be assumed that they have a policy to follow in these matters, but according to them this is not the case.

"*We are told to advice farmers to use artificial inputs to increase the production, but also to promote organic methods*." Extension worker Rakai.

Having a more clear policy for extension workers on what to advice farmers when it comes to use of organic methods could thus be a way to increase the use of organic methods in Uganda.

The extension workers are however not the only ones influencing farmers' use of different methods. By looking at the following quote from a certified organic farmer in Luweero it is possible to see how influential an outsider, in this case an export company, might be when it comes to a farmer's decision making on which methods to use.

"*I stopped using chemicals because teachers from [export company] told me I would get higher price for organic. But today we struggle to survive. If I don't get higher price soon I might start to use chemicals again*."

It can be questioned if it is good that an export company have this much influence over which methods the farmers use. It is not sure that the export company thinks about what is best for the farmers in the long term, but are more concerned about their own profit and short term solutions. From conversations with farmers and an export company in Luweero it was clear that the approach was top-down, with the export company telling the farmers what to do and when, some of the farmers not reflecting over why.

The quote also shows that economic incentives (a higher market price) can make a farmer change from conventional to organic methods, and that if the expectations about increased profit are not met the farmer might convert back to the use of conventional methods again.

Conventional farmers who convert to organic methods because of concerns about environment or health might be less likely to change back to conventional because they see other benefits with organic than economic profit. To convince farmers to use organic methods by promising economic benefits alone is thus not enough to increase use of organic methods in the long term since these economic benefits cannot be guaranteed. It is therefore important to emphasize other benefits, e.g. for health and environment, to create incentives for farmers to continue to use organic methods.

5.3.3 Limited by perceived behavioral control or actual control

Even if farmers' behavioral beliefs create very positive attitudes towards the use of organic methods and the perceived social pressure is in favor, it is not sure that an intention to use organic methods appears. Some conventional farmers are limited by their own perceived behavioral control, i.e. they do not believe that they could carry out organic methods and successfully support themselves and their families.

Some conventional farmers are limited by the actual control they have over the situation, e.g. they cannot access enough organic material or manual labor to use only organic methods. In the same way some of the organic farmers are limited by actual control by not being able to purchase artificial inputs, either because they are not available or because they are too expensive. This is also a reason for some conventional farmers to use both conventional and organic methods, actual control over the behavior hinders them from using only organic or only conventional methods, and they therefore use a combination of them both.

5.3.4 Can perceived behavioral control substitute measurements of actual control in this case?

Perceived behavioral control can in some cases substitute measurements of actual control (Ajzen, 2005), since if a farmer believes that he cannot access enough organic material (even if there is enough organic material and he is thus not limited by actual control) he will be limited by this belief.

In many cases the farmers' perception of behavioral control seems to correspond well with the actual control they have over the situation, e.g. access to organic or conventional input. In some cases the perceived behavioral control might not correspond with actual control. Some farmers believe that if they use organic methods they cannot get rid of pests and diseases, but it might be that they are not aware of the most efficient organic method to protect the crops from pests and diseases, since other farmers growing the same crops under the same conditions use organic methods with good results. Lack of knowledge gives them a perception of low behavioral control, but they are not limited by actual control.

This means that to increase the use of organic methods in Uganda, these farmers that are not limited by actual control must be helped in a way that increases their perceived behavioral control, i.e. increases their beliefs in being able to successfully use organic methods. Offering farmers more trainings and demonstrations in how to use organic methods would be one way of doing so.

5.3.5 Summary of farmers' intentions and behavior

Attitudes originating from behavioral beliefs about profitability, together with perceived behavioral control i.e. the perception of how easy or difficult it will be to successfully carry out the behavior, seem to be the most important influencers over farmers' intentions whether or not to use organic methods. Perceived social pressure from important others, e.g. extension

workers and export companies also influence the farmers' intentions. Regardless of intentions, the decisive factor affecting many of these farmers is the amount of actual control they have. Availability and affordability of both artificial and organic inputs, and of labor, highly affects which methods the farmers end up using. A summary of the findings can be found in figure 2.

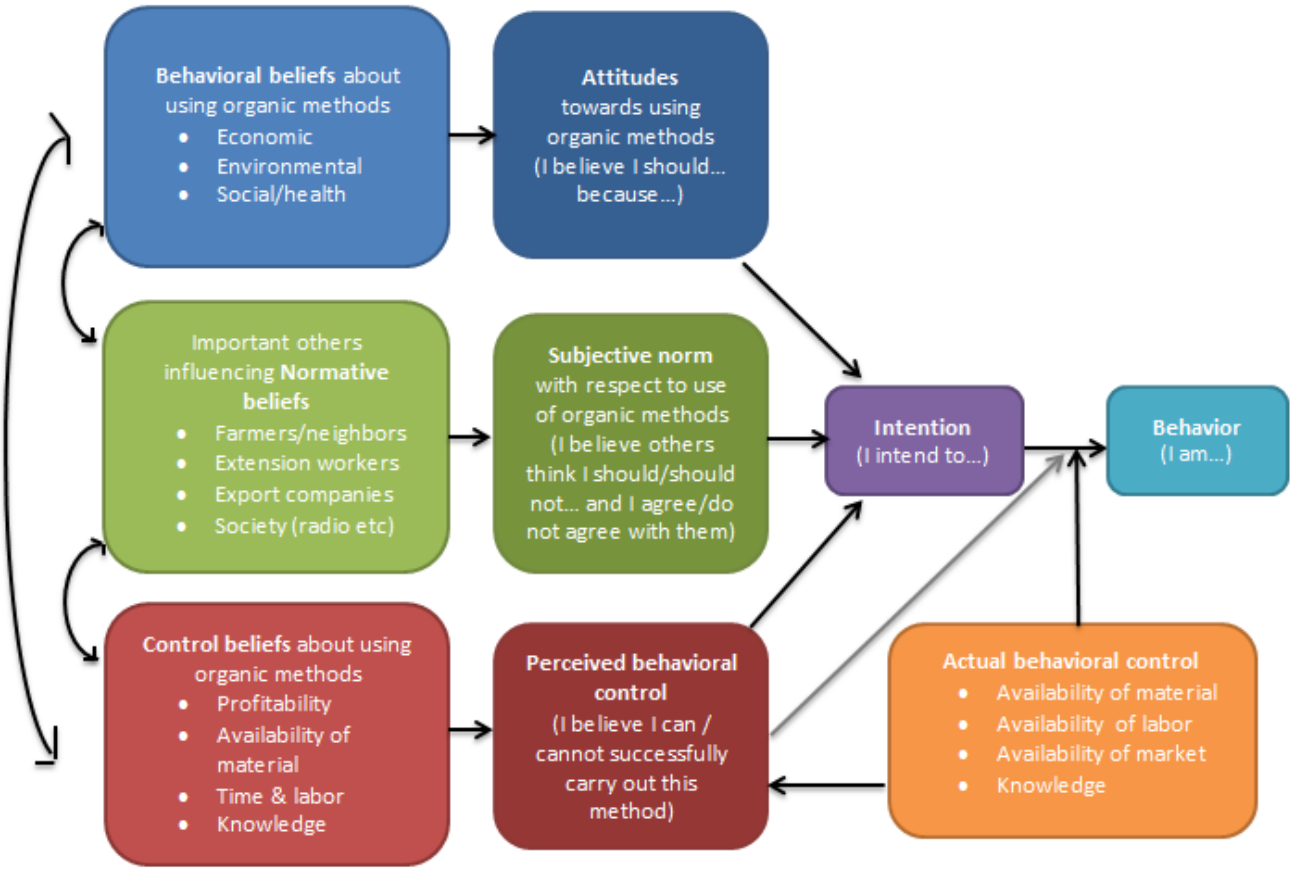

Figure 2. The theory of planned behavior modified from Ajzen (2002), overlaid with findings from the study (with inspiration from Toric, 2005). Important beliefs affecting attitudes, subjective norm and perceived behavioral control are presented, together with factors influencing actual behavioral control.

5.4 Research question 4. What methods would the farmers in Uganda prefer to use if they could choose freely without being limited by external factors?

The results show that there is a large interest among both organic and conventional farmers to use only organic methods for soil fertility management and crop protection. This is a very positive finding for anyone interested in expanding the use of organic methods amongst farmers in Uganda.

5.4.1 Conventional farmers

Many conventional farmers would like to stop using chemicals because of health concerns. The potential harm chemicals can have on human health is widely discussed amongst the farmers, it is taught at workshops held by NGOs and governmental extension services, and

health centers and radio commercial campaigns promote the use of organic methods as a healthier option. Concerns for the environment was also mentioned as a reason for wanting to use only organic methods, but the concern for the own health is stronger. This whole "abandon the use of chemicals because it is bad for human health" campaign going on in the Ugandan society can be seen as very successful since so many of the conventional farmers said that they would like to stop using chemicals because of health reasons. However, it is not enough to create a change, and what is needed to be addressed are the reasons these farmers gave for still using chemicals even though they would prefer to use only organic methods. These will be analyzed further under research question 5 – What would make Ugandan farmers today using conventional methods switch to only organic methods.

5.4.2 Organic farmers

A few of the organic farmers would like to use artificial inputs but cannot access them, either because they are unavailable or because they cannot afford them. These farmers are then what could be called "organic by default", since their non-use of artificial inputs is not a voluntary decision. They have limited actual control over the behavior. Their reasons for wanting to use artificial inputs were beliefs that it improves soil fertility, makes it easier to control pests and diseases, and would make work on the farm less tiresome. Some were not satisfied with the performance of the organic methods they use today and thought that they could improve their yield, and thus income, if they also could use artificial inputs. However, some of the farmers wanting to use artificial inputs answered "nothing" when asked how they manage soil fertility and crop protection on their farms today, implying that they do not use any organic methods either, despite the fact that they thought soil fertility on their farm was bad and that pests and diseases was a problem. Their wish for use of artificial inputs can thus not be disappointment with performance of organic methods, but rather disappointment with the results of doing nothing at all. It can be questioned if these farmers can be called "organic", simply because of their non-use of artificial inputs. These farmers also said that they had gotten no training in farming techniques (organic or conventional), that they had no access to extension services, and that they had only little knowledge about organic methods. Training, where these farmers learn about organic methods could be an important way to make them start to use organic methods for soil fertility management and crop protection.

A majority of the organic farmers said that they wish to continue to use only organic methods, but some of them saw issues that might force them to change to conventional methods. These issues need to be addressed to enable organic farmers to continue to use organic methods, and they will be analyzed further under research question 6 – What would make Ugandan farmers today using organic methods switch to conventional methods.

5.5 Research question 5. What would make Ugandan farmers today using conventional methods switch to organic methods?

Many of the conventional farmers would like to switch to organic methods for soil fertility management and crop protection, and when asked what would make them do so they brought up several barriers they see to the use of organic methods. These barriers need to be removed to enable an expansion of the use of organic methods. They also talked about positive things with the use of organic methods that might make them change, and these need to be explored as opportunities to expand the use of organic methods.

5.5.1 Money

Financial concerns are common among the smallholder farmers, and many conventional farmers feel that they would not make enough money if they used organic methods today. However, some of them say that they would use organic methods if they were given some kind of support, and some of them suggest that the government should subsidize organic agriculture by providing cheap organic materials. Today Uganda does not have a policy for organic agriculture. A draft organic policy is still waiting for approval by the government (Namuwoza and Tushemerirwe, 2011), and without a clear policy it is unlikely that the government will subsidize organic agriculture.

Other farmers say that they use conventional methods because they see them as so cheap, but that they would change to organic methods if artificial inputs became too expensive. This suggests that the use of organic methods might increase if the price of artificial inputs goes up. According to extension workers in Rakai district, the price of artificial inputs is increasing, but use of chemicals is also increasing, especially herbicides because people do not want to weed with a hoe. The present increase in prices for artificial inputs is thus probably not so high that a majority of farmers using them today would have to stop.

5.5.2 Time and labor

Some conventional farmers also say that they would use organic methods if these were less time consuming and labor demanding. What takes time with using organic methods is mainly the collection and preparation of organic manure/compost and materials for biorationals, and the manual removal of weeds by the use of a hoe. If ready-to-use organic manure/compost and biorationals could be purchased in the agro-shops, this might make conventional farmers use these options instead. Since these farmers purchase artificial inputs today it can be argued that they would have the cash needed to buy organic inputs if these were sold at reasonable prices. A mechanization of the agriculture, with use of tractors, would make organic removal of weeds faster and easier, but would also make the farmers dependent on external inputs like fuel for the tractor.

5.5.3 Market

Some conventional farmers say that they would change to organic methods if the market price for organic products was higher. The market price is driven by demand, and even though most people in Uganda say that they want to buy organic products (since there should be less risk that these have chemical residues) there is no labeling of organic products on the local markets, making it hard to get a higher price for organic products. Labeling of organic products also on the local market would make it possible to distinguish between crops produced with organic methods and crops produced with conventional methods. This would make it easier for organic farmers to get a premium price for their products, but only if the local buyers are willing to pay more for organic crops. A study made by Ndungu (2006) showed the most important considerations when buying food to be price and affordability. Another way would be to introduce labeling of organic products on the local market, but without a premium price. Consumers who prefer to eat organic because of health aspects are most likely to buy organic products instead of conventional if the price is the same, and the organic labeling would thus help to create an increased demand for organic products and decrease the demand for crops produced with help of artificial inputs. If it is easier to sell organic crops than to sell crops produced with conventional methods this could function as an incentive for more farmers to convert to organic methods.

A market for organic products can be found e.g. in the capital Kampala, but for many farmers it would be better if a market for organic products could be found locally. Because of bad infrastructure it can be both difficult and expensive to transport crops to a regional market (deGrassi, 2005; Wiggins, 2005).

5.5.4 Access to organic material

Access to organic material has already been mentioned under time and labor. Many conventional farmers mentioned lack of enough organic material as a barrier to the use of organic methods, and it is not an easy problem to address. If more farmers start to use organic methods, the demand for organic material will increase, making it more difficult to obtain enough quantities. This makes lack of organic material something that has to be dealt with to create an enabling environment for the use of organic methods.

Those conventional farmers who would like to use organic methods, but are hindered by lack of access to organic material could be called "conventional by default", just as organic farmers who would like to use artificial inputs but cannot access them are sometimes called "organic by default". This shows that even though organic agriculture is seen as using natural methods based on locally available resources, it is not always an option for the farmer because of limited access to material.

5.5.5 Health

There are many health concerns regarding chemicals amongst farmers in Uganda, and some conventional farmers report that they consider changing to organic methods because of this. It is not a positive thing that farmers experience negative side effects of using chemicals, but that this occurs emphasizes the importance of creating an enabling environment for the use of organic alternatives.

5.5.6 Knowledge

Some conventional farmers say that they would use organic methods if they had more knowledge about them, and while lack of knowledge is a barrier, this can also be seen as a great opportunity to increase the use of organic methods. Governmental extension services and NGOs can offer more workshops and trainings in the use of organic methods. This is actually something that many farmers wanted, and they said that the trainings that are offered today is not enough and does not go deep enough into the practical use of organic methods.

Also the conventional farmers today saying that nothing would make them change to organic methods, since they do not believe they can support their families on those, could perhaps change this opinion if they gained more knowledge about the use of organic methods. Interaction with farmers already using organic methods would be good, since these farmers demonstrably manage to support their families on the use of organic methods.

5.6 Research question 6. What would make Ugandan farmers today using organic methods switch to conventional methods?

Very few of the organic farmers in the study would like to switch to conventional methods, those who would say they would do so if they could access and afford artificial inputs. While it is a positive finding that a majority of the organic farmers wish to continue to use organic methods for soil fertility management and crop protection, it is troubling that some of them

see issues that might force them to change to conventional methods. These issues need to be addressed to facilitate for the farmers to continue to use organic methods.

5.6.1 Market and money

That export companies only buy a small part of the harvest from each certified farmer is a big problem for these farmers since the rest of their harvest has to be sold at the local market where the absence of labeling makes that no distinguishing is made between organic and conventional products and thus there is no premium price for the organic products. Some of these certified organic producers consider this as such a big problem that they are considering to use conventional methods instead because they are not making profit as it is today. This is an interesting finding since it shows that certification of organic production and a contract with an export company is not automatically a way for smallholder farmers out of poverty and into a secure financial situation.

In some cases the export companies want to make sure that the farmers they have contracted can deliver enough products, and therefore sign contracts with more farmers than is necessary, in case some of the farmers would fail to deliver. This then leads to that they only collect a small part of the harvest from each farmer. It is a serious problem that export of organic products might instead of encourage farmers to use organic methods make them consider to change to conventional methods when the export company cannot live up to the farmers expectations and provide a large enough market with premium prices for organic products.

The local market for organic products needs to be developed in order to create a sustainable demand for organic products. Sahota (2009) reports that the recent financial crisis has caused the global demand for organic products to slow down, and likely the first to be affected by this are producers in developing countries with a focus on the export markets. Namuwoza and Tushmerirwe (2011) report that the effect of the global economic recession was felt in the Ugandan organic export sector with a decreased growth rate compared to previous years.

Some farmers feel that if they do not get enough money for their organic products when selling them, they might as well change to less tiresome conventional methods. To motivate farmers to use organic methods it has to be profitable to sell organic products, and an important step towards this would be to introduce labeling of organic products on the local market, something that is discussed in Uganda today.

5.6.2 Labor

Just as conventional farmers see labor intensiveness as a barrier to the use of organic methods, some of the organic farmers see the amount of labor needed as something that might force them to give up organic methods and turn to less labor demanding conventional methods. This can become an apparent problem for older farmers who no longer are as strong as when they were younger, and thus no longer can carry out the heavy manual labor needed for e.g. weeding a field with a hoe. To enable old farmers, and any farmer unable to carry out hard manual labor, to continue to use organic methods it has to be possible to hire in labor to a reasonable price, or organic methods that are less labor demanding needs to be developed and introduced to these farmers. A problem in Uganda today is the high rural-urban migration, where especially young people go to the cities in hope of finding jobs there. Farming is seen by many as a low-status occupation, making it difficult to find the manual labor needed for use of organic methods. It is often argued that a big surplus of labor in developing countries is an advantage when it comes to organic agriculture because it leads to cheap labor and lower production costs. However, unattractiveness of working in the agricultural sector makes labor

expensive for smallholder farmers in Uganda. This makes the use of organic methods easier for large families with access to "free" labor within the family, compared to single farmers who might have to hire labor instead.

5.6.3 Access to organic material

Some organic farmers say that if they could not access enough organic material they would have to change to conventional methods instead, using artificial inputs. Increasing age of the farmer can also make it harder to access enough organic material since this often involves physical effort, e.g. taking care of cattle and collect material to biorationals. Again, this would be facilitated if organic inputs could be bought in agro-shops, ready to apply without preparation but just as said before this demands that the farmer has enough cash to purchase the material instead of preparing and collecting them.

5.6.4 New pests and diseases

Some organic farmers say that the arrival of new pests and diseases might force them to use conventional methods, e.g. spray chemicals, to protect their crops. This might be an increasing problem with the ongoing climate change and some farmers report that they already experience more pests and diseases with the changing climate. It is therefore important that continuous research is carried out about how to fight these new pests and diseases with organic methods, and equally important that new methods are taught to the farmers through workshops and trainings to give them the best possibilities to protect their crops.

5.6.5 Knowledge/beliefs

According to some organic farmers a change in knowledge or beliefs might make them change to conventional methods. Some farmers use organic methods because they think they are better for the health or for the environment, but would change to conventional methods if they thought these were better for the health or for the environment. Other farmers believe that yields are similar when you use organic or conventional methods, but say that if they noticed farmers using conventional methods getting higher yields they would also change to conventional methods. Also getting new advice about using conventional methods from people who previously advised them to use organic methods would make some farmers change to conventional methods, showing how important influence other people might have over farmers decision making on which methods to use. Arguably, if farmers today using conventional methods learned more about organic methods, and started to think that these were better, perhaps encouraged to use organic methods by people whose advice they follow or opinion they consider important, they would change to use of organic methods if given the opportunity.

6. Discussion

The use of organic methods has been promoted as a good alternative for small-scale farmers in developing countries, not only for its supposed benefits for health and environment, but also as a way to improve income and food security. The aim of this study was to investigate the preconditions for, and barriers to, use of organic methods for soil fertility management and crop protection in Uganda, from a farmer's perspective, by looking at why/why not Ugandan farmers use organic methods.

This chapter discusses the implications of findings from the study, provides some practical advice on what should be addressed to create an enabling environment for expanded use of organic methods in Uganda, and gives some recommendations for further research.

6.1 Implications of the findings

6.1.1 The theory of planned behavior: why organic?

Behaviors are complex and it turned out to be many factors influencing why, or why not, farmers in Uganda use organic methods for soil fertility management and crop protection. This study supports the theory of planned behavior in that behavioral intention to use organic methods is influenced by attitude, social pressure and level of perceived behavioral control.

Attitudes originating from behavioral beliefs concerning economic performance were found to be more influential than environmental and health beliefs over intentions whether or not to use organic methods. This is quite understandable since the study was carried out among poor smallholders in a developing country, where small profit margins often force the farmers to prioritize economic aspects to support their families. In a previous study among farmers in the Netherlands the personal values were found to be more important than economic considerations (Schoon and Te Grotenhuis, 2000). The theory of planned behavior acknowledges that different beliefs will have different relative importance on intentions for different people in different situations, which can be said to be the case here. Most smallholders in Uganda could probably not afford to prioritize personal values over economic considerations.

The high importance of economic performance also helps to explain why export companies were found among the "important others" influencing the perceived social pressure on which methods to use. Farmers who prioritize economic aspects are likely to listen to export companies who offer premium prices for products produced with organic methods. Extension workers were also found among "important others" and farmers see their advice as important, which is a positive finding since it means that farmers are open to obtaining more knowledge and they also expressed wishes to learn more about organic methods. Spreading more knowledge about organic methods through the extension workers then probably means that the farmers would absorb this knowledge and hopefully implement it. Neighbors and other farmers were also seen as "important others", offering both inspiration and motivation. This opens up for the possibility to increase farmers' knowledge about organic methods by helping them learn from each other.

The spreading of more knowledge on how to use organic methods is important, since lack of knowledge was one of the reasons some farmers experienced a low perceived behavioral control. That farmers choose not to use organic methods because they feel that they cannot

handle them is a barrier, but it can also be seen as an opportunity to increase the use of organic methods by improving the farmers' knowledge about organic methods and thus increase their beliefs in themselves to use these methods successfully. Another control belief concerned the ability to support the family using organic methods which, once again, shows how important the economic aspect is for these farmers.

Many farmers turned out to be limited by actual control over the behavior. It was not expected that so many of the farmers would experience insufficient availability of organic material as a control factor limiting them from the use of organic methods. Perhaps is this a problem more typical for developing countries since it has previously been identified as a barrier to use of organic methods in Bangladesh (Sarker and Itohara, 2008). In developed countries the better infrastructure means that farmers in general have better access to whatever inputs they would like to use, while smallholders in developing countries have to produce the inputs on their own farm or get them from local surroundings. It was also surprising that lack of labor would be a problem, considering the high population growth rate and large share of the population involved in agriculture. However, this had its explanation not in lack of potential labor but in low attractiveness in farming as occupation, making it expensive for smallholders to hire labor to their farms.

6.1.2 Are connections to the export market a benefit or not?

Part of the aim with this thesis was to identify barriers to expanded use of organic methods in Uganda. Connections to the export market through a contract with an export company is often seen as an advantage, and thus something that could make more farmers interested in the use of organic methods if these connections were made available to them. Studies in Uganda have found certified organic farmers producing for the export market to have a higher net farm income compared to conventional farmers (Gibbon and Bolwig, 2007) and increased household food security through augmented cash income which made it possible to purchase food at the market (Bolwig and Odeke, 2007). Jacobsen (2009) found that linkages to organic export markets led to increased incomes and financial stability for smallholder farmers in Uganda.

A finding in this study was however that certified organic farmers contracted to export companies do not necessarily benefit much from this. It is not easy to identify the reason for these different findings. Studies being carried out in different areas of Uganda, or different crops exported could influence, since Gibbon and Bolwig (2007) found large profitability differences between farmers of different organic cash crops. In his study, Jacobsen also talks about a "*steady organic buyer*" (Jacobsen, 2009:40), which suggests that the farmers participating in that study could sell a larger part of their harvest to the exporter, and also be sure to sell every season which was not the case for some of the farmers in Luweero. According to one export company in the area, it has sometimes been difficult for them to find buyers, which means that they in turn collect less from the farmers. As an example, in 2009/2010 the export of fresh fruit decreased due to high freight costs (Namuwoza and Tushmerirwe, 2011), so even if there still is a global demand for organic products it can sometimes be too costly to export them from a land-locked country like Uganda.

The contracts between farmers and export companies are much to the advantage of the export company. The organic market is the buyer's market, because even though there is a large demand for organic products on the export market, there are so many farmers in Uganda which are potential suppliers for the organic export companies. If the export of certified organic products is to benefit the smallholder farmers, the buyer (export company) must be

able to guarantee a minimum purchase from each farmer, high enough for these farmers so that the extra money from premium prices is enough to compensate the higher cost they experience for the more labor intensive methods. Fluctuating market demand makes this difficult for the export companies. The best would therefore be to develop the local markets for organic products. If farmers can sell their organic products to a good price also there, it would not be such a financial problem for them when the export company buys only a small part of their harvest.

6.1.3 Possibilities and constraints for expanded use of organic methods for soil fertility management and crop protection

In general, attitudes towards use of organic methods were very positive among the Ugandan farmers, mostly because of believed benefits for environment and human health. This study showed that many conventional farmers would like to use organic methods for soil fertility management and crop protection, which means a good possibility to expand the use of organic methods. Farmers' expressed willingness to learn more about organic methods is also an important precondition. But to make this expansion of organic methods reality some constraints these farmers are facing have to be dealt with. Factors leading to limited perceived behavioral control and limited actual control are challenges that have to be addressed. Farmers must have enough knowledge about organic methods, have access to enough organic material and enough labor, and be able to produce and/or sell enough products to support their families.

Many farmers in the study used organic methods successfully today, showing that good conditions for use of organic methods exist in Uganda. The problem is that these conditions are not shared by all farmers, as some farmers struggle to e.g. access enough organic material. Solving this problem can be a greater challenge than if the situation had been the opposite; i.e. if large quantities of organic material were available, but farmers had negative attitudes towards the use of organic methods. Attitudes can be changed through education and information, but an agro-ecological control factor like lack of organic material can prove a bigger challenge, especially if lack of infrastructure makes it difficult to transport material from one area to another.

There is a potential risk that even more farmers find it difficult to use organic methods in the future, as population growth puts more pressure on the land and climate change can increase the number of pests and reduce the availability of organic material. Just as conventional farmers experienced lack of organic material, lack of labor and lack of profit as barriers towards the use of organic methods, the same things were seen as issues by many organic farmers that might force them to change to conventional methods. The challenges towards use of organic methods must therefore be taken seriously and dealt with, so that also future generations can use organic methods and be successful farmers – a wish expressed by most of the respondents in this study.

6.2 Practical advice to create an enabling environment for use of organic methods

This section will provide some practical advice on things to address in order to create an enabling environment for use of organic methods, where more farmers can start to use organic methods for soil fertility management and crop protection, and where farmers already using organic methods can continue to do so. The suggestions are based on the barriers and

challenges to use of organic methods found in the study, and when possible examples of situations where similar advice have been implemented are given.

6.2.1 More knowledge

Farmers should be offered opportunities to learn more about organic methods, and focus should be upon teaching and demonstrating practical use of different methods. A good way to reach out to many farmers is to offer trainings to farmers' groups, which is done today, because then the farmers also learn from and motivate each other. However, it is important to remember that not all farmers are members of this type of groups and also non-members should be given the opportunity to learn more. A good way to inspire farmers and show how organic methods can be implemented in practice is to arrange visits to farmers who successfully use these methods today. When farmers see how other farmers manage to use organic methods, it can increase their confidence, i.e. "if he can use these methods like this, so can I". This was successfully done in a study in Thailand, where action research including field trips and knowledge sharing forums between farmers made farmers increase their knowledge in organic farming, improve their farm production by implementing the newly gained knowledge, and also share this knowledge with neighbors, thus spreading the knowledge further (Nuntapanich, 2012).

6.2.2 Improve access to organic material

To be able to use organic methods farmers need to be able to access enough organic material needed for soil fertility management and crop protection. This means that farmers who cannot produce enough material on their farms or collect it in the surrounding environment must be given the possibility to purchase it in shops, or from other farmers. Cattle restocking projects have been suggested to address shortage of organic manure in Zimbabwe (Svotwa et al, 2009), but to make this work enough water and feed has to be available for the farmers to keep more animals. A possibility to increase availability of organic material is to take one step up from the individual farm level, and help farmers collaborate with each other. One farmer might have excess manure, but lack ingredients for biorationals, and vice versa. This type of collaboration occurs already today, when farmers buy or exchange material with each other, but it could be done through more organized forms e.g. through the farmers' groups.

6.2.3 Increase availability of labor through improving the status of farming as occupation

A problem in Uganda today is that farming is seen by many as a low-status occupation, making it difficult and expensive for smallholders to find the labor needed for the more labor-intensive organic methods. To increase the availability of labor in agriculture it is necessary to improve the status of farming as occupation. The problem is that it is the image of agriculture as tiresome and dirty that has given it low status in the first place, and since organic methods often mean more manual labor this does not help to make farming more attractive. A project in Senegal aiming at bringing young people back to farming showed that young people introduced to modern tools and less tiresome techniques gained a more positive view of farming (Sall, 2012). This project however included artificial inputs, but developing less tiresome organic methods also has potential to attract more people to farming. Educating the public in what farmers contribute with, e.g. food, ecosystem services etc. could also help to change the opinion and create more positive attitudes towards farming, and thus increase the available labor.

6.2.4 Create a local market for organic products

To avoid dependency on the export market, or force farmers to transport their products to Kampala where an organic market can be found, the local markets for organic products need to be developed. Local markets for organic products would diversify the business risk associated with fluctuations on the global export market (Sahota, 2009). A first step would be to initiate labeling of organic products on the local markets to make it possible to distinguish between organic and conventional products. This could make it easier for the organic farmers to sell their products, possibly also to a higher price. Local labeling of organic products is discussed in Uganda today, and will hopefully be implemented soon. When it is, it is important that it is easy for farmers to get their products labeled, and that it is not associated with high "certification costs", which might act as a barrier. Allowing farmers to be certified in groups, as is often done with certification for export today, would be one way. However, it is important that the farmers themselves can organize the certification so that they not get dependent on a company doing it for them as is the case for farmers producing for organic export.

6.2.5 Mitigate climate change

An important issue needed to be addressed, not only for the use of organic methods, but for agriculture in large, is the ongoing climate change. The farmers experience that the climate in Uganda has become dryer and that the rain seasons have become increasingly unpredictable. Water is already a scarce resource in many areas of the country, and insufficient amounts of water do not only directly make it difficult to grow crops but also affects indirectly by creating problems with producing material needed for the use of organic farming methods, such as animal manure and ingredients for biorationals. Although climate change is a global problem, there are things that can be done on a regional and local level to improve climate. Planting more trees is one thing, and seedlings are given to farmers for free by several organizations in Uganda. Trees on farms can both mitigate climate change through carbon sequestration and enhance the resilience to changing climate by reducing effects of weather extremes (Neufeldt et al, 2009). Of equal importance is to not convert more forests or wetlands to agricultural land, but this is difficult since the high population growth in Uganda constantly demands a higher food production and this has mainly been achieved by taking more land under cultivation. To avoid this, the production should be increased on land that already is under cultivation and one way of achieving this could be the use of organic methods, since studies from Uganda (Gibbon and Bolwig, 2007) have shown organic methods to increase the yield.

6.2.6 More research

If organic methods for soil fertility management and crop protection are to be used by farmers in Uganda, they need to be effective. They need to be suitable for the specific conditions in Uganda, and also be able to handle changing conditions, e.g. new pests and diseases that might come with the change in climate. To ensure that methods are up to date and adapted to Ugandan conditions, continuous research should be carried out in Uganda. This research should be in close collaboration with farmers, so that it can try to find solutions for the problems they face at the moment. Research findings must also be transferred back to farmers in a good way, so that they can benefit from improved methods.

6.2.7 More support to the agricultural sector

The measures suggested above are not without costs, and financing must come from somewhere whether it is the government or non-governmental organizations. The share of

Uganda's national budget allocated to the agricultural sector has not been over 3% during the past two decades and even when donor financing is included the allocation to agriculture has never exceeded 5% of the budget, which is far from the 10% of the national budget that Uganda's government committed to allocate to agriculture and rural development as part of the Maputo Declaration in 2003 (MAAIF, 2009). Considering the large share of the population involved in agriculture in Uganda, more money should be allocated to the sector.

6.3 Recommendations for further research

This study is exploratory in its design and provides a broad overview over factors influencing farmers' use or non-use of organic methods, and their perceived preconditions and barriers towards use of organic methods. More detailed, in-depth, studies could be carried out in many parts of the findings brought up in this thesis. As mentioned as a limitation in the methodology chapter, this study does not investigate the relative importance between different beliefs affecting farmers' intentions. By investigating this it would be possible to, with greater assurance, point out which aspects should be addressed to increase farmers' intentions to use organic methods, for anyone interested in this. It would also be interesting to look deeper into actual control factors that limit the farmers, such as unavailability of organic material to see what can be done about this. How to attract more people to farming to enable use of more labor intensive organic methods is also something that needs more research. Another topic that should be explored further is how much influence important others, e.g. export companies, have over farmers' decision on which methods to use. By carrying out interviews in more districts it would also be possible to assess the general situation in Uganda with higher accuracy, or detect local variability within the country.

7. Conclusions

The purpose of this thesis was to, from a farmer's perspective; explore preconditions for, and barriers to, use of organic alternatives for soil fertility management and crop protection in Uganda, by investigating why, or why not, farmers use organic methods. Many factors turned out to influence farmers' decision on which methods to use. This study support the theory of planned behavior (Ajzen, 1991) in that behavioral intentions are influenced by attitude, social pressure and level of perceived behavioral control. Overall, Ugandan farmers have a very positive attitude towards organic methods, which is an important precondition to expand the use of these methods. Perceived social pressure created by important others (e.g. neighbors, extension workers, export companies) can also influence the farmers' intentions to use certain methods. However, not all farmers feel that they can use organic methods. Believed benefits for health and environment are sometimes overshadowed by financial concerns. Low perceived behavioral control can prevent farmers with positive attitudes towards organic methods from forming intentions to use them. Similarly, the amount of actual control the farmers have over the behavior can prevent farmers with intentions to use organic methods from carrying out this behavior. Several barriers were identified, the most important ones being lack of organic material, lack of labor, lack of knowledge, and lack of profit due to markets that do not distinguish between organic and conventional products. These barriers for conventional farmers were also seen by many organic farmers as issues that might force them to start using conventional methods, something that proves the importance of addressing these matters to create an enabling environment for the use of organic methods. This study has showed that there exist possibilities, but also constraints to an expanded use of organic methods among smallholder farmers in Uganda. Many farmers want to use organic methods, but several challenges need to be addressed to enable them to do so.

This thesis has contributed to a better understanding of why, or why not, Ugandan farmers use organic methods for soil fertility management and crop protection. Exploring these preconditions and barriers has made it possible to discuss possibilities and constraints to expand the use of organic methods. The exploratory approach in the research design has made this study very broad and provided a wide range of findings that could form the basis for future, more in-depth, research. Economic, social and environmental factors all influence why, or why not, farmers in Uganda use organic methods for soil fertility management and crop protection. Its inclusion of these three aspects makes agroecology a useful concept when looking into this type of behavior.

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References

Ajzen, I. (1985) From intentions to actions: A theory of planned behavior. In: Kuhl, J. and Beckmann, J. (Eds.) *Action-control: From cognition to behavior.* 11-39. Heidelberg: Springer.

Ajzen, I. (1991) The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes* 50, 179-211.

Ajzen, I. (2001) Nature and operation of attitudes. *Annual Review of Psychology* 52, 27-58.

Ajzen, I. (2002). Constructing a TpB Questionnaire: Conceptual and Methodological Considerations. [online] Available from: http://socgeo.ruhosting.nl/html/files/spatbeh/tpb.measurement.pdf [2012-05-19].

Ajzen, I. (2005) *Attitudes, Personality and Behavior*. 2nd edition. Berkshire: Open University Press / McGraw-Hill.

Ajzen, I. and Fishbein, M. (1980) *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Allen, J. and Bernhardt, K. (1995) Farming practices and adherence to an alternative-conventional paradigm. *Sociologia Ruralis* 60(2), 297-309.

Altieri, M.A. (2002) Agroecology: the science of natural resource management for poor farmers in marginal environments. *Agriculture, Ecosystems and Environment* 1971, 1-24.

Alvesson, M. and Sköldberg, K. (2009) *Reflexive Methodology: New Vistas for Qualitative Research.* 2nd edition. London: Sage Publications.

Auerbach, C.F. and Silverstein, L.B. (2003) *Qualitative data: an introduction to coding and analysis*. New York: New York University Press.

Bayite-Kasule, S., Lubega Korugyendo, P., Benson, T. (2011) Fertilizer use among smallholder farmers in Uganda. [online]. Available from: http://addis2011.ifpri.info/files/2011/10/Poster_1A_Stephen-Bayite-Kasule.pdf [2012-05-06].

Bernard, R.H. (2005) *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. Oxford: Altamira Press.

Bigirwa, J. (2005) Fair-trade and Cooperatives – The Uganda experience. [online]. Available from: http://www.copac.coop/about/2005/uganda-fairtrade.pdf [2012-05-05].

Bolwig, S. and Odeke, M. (2007) Household food security effects of certified organic farming in tropical Africa: a gendered analysis. Export Promotion of Organic Exports from Africa. [online] Available from: http://www.grolink.se/epopa/publications/EPOPA%20Report%20on%20Food%20Security%20impact%20of%20organic%20production.pdf [2012-06-11].

Bonabana-Wabbi, J., Taylor, D.B., Kasenge, V. (2006) A Limited Dependent Variable Analysis of Integrated Pest Management Adoption in Uganda. [online]. Available from: http://ageconsearch.umn.edu/bitstream/21040/1/sp06bo10.pdf [2012-04-27].

Bouagnimbeck, H. (2011) Organic Farming in Africa. In: Willer, H. and Kilcher, L. (Eds.) *The World of Organic Agriculture. Statistics and Emerging Trends 2011*. 104-110. IFOAM, Bonn, & FiBL, Frick.

Boyatzis, R.E. (1998) *Transforming qualitative information: thematic analysis and code development*. Thousand Oaks: Sage Publications.

Bumb , B.L., Teboh, J.F., Mariko, F., Thiam, M. (1992) The Policy Environment and Fertilizer Sector Development in Mali: An Assessment. [online]. Available from: http://pdf.usaid.gov/pdf_docs/PNABW492.pdf [2012-05-07].

Charmaz, K. (2003) Qualitative interviewing and grounded theory analysis. In: Gubrium, J.F. and Holstein, J.A. (Eds.) *Inside interviewing: new lenses, new concerns*. 311-330. Thousand Oaks: Sage Publications.

deGrassi, A. (2005) Transport, Poverty and Agrarian Change in Africa: Models, Mechanisms and New Ways Forward. *IDS Bulletin 36.2 New Directions for African Agriculture*, 52-58.

de Vaus, D.A. (2002) *Surveys in social research*. 5th edition. London: Routledge.

de Zeeuw, H. and Wilbers, J. (2004) PRA Tools for studying Urban Agriculture and Gender. [online] Available from: http://www.ruaf.org/sites/default/files/gender_tools.pdf [2012-06-06].

Fairweather, J.R. (1999) Understanding how farmers choose between organic and conventional production: Results from New Zealand and policy implications. *Agriculture and Human Values* 16, 51-63.

Fairweather, J.R. and Campbell, H. (1996) The Decision Making of Organic and Conventional Agricultural Producers. [online] Available from: http://researcharchive.lincoln.ac.nz/dspace/bitstream/10182/521/1/aeru_rr_233.pdf [2012-05-10].

FAO (2011) Country briefs – Uganda. [online] (2011-07-20). Available from: http://www.fao.org/countries/55528/en/uga/ [2012-05-06].

Forss, K. and Lundström, M. (2004) An evaluation of the programme "Export Promotion of Organic Products from Africa". Phase II, Sida. [online]. Available from: http://www.grolink.se/epopa/publications/EPOPA-Phase-2-Evaluation-04.pdf [2012-06-20].

Gibbon, P. and Bolwig, S. (2007) The Economics of Certified Organic Farming in Tropical Africa: A Preliminary Assessment. DIIS Working Paper no 2007/3. Sub-series on Standards and Agro-Food Exports (SAFE) No. 7.

Gladwin, C.H. (1989) Indigenous Knowledge Systems, The Cognitive Revolution, and Agricultural Decision Making. *Agriculture and Human Values 6(*3), 32-41.

Guest, G., Bunce, A., Johnson, L. (2006) How Many Interviews Are Enough? An Experiment with Data Saturation and Variability. *Field Methods* 18(1), 59-82.

Hattam, C. (2006) Adopting Organic Agriculture: An Investigation Using the Theory of Planned Behaviour. [online]. Available from: http://ageconsearch.umn.edu/bitstream/25269/1/pp061031.pdf [2012-05-07].

IFOAM (2009) The Principles of Organic Agriculture. [online] (2009). Available from: http://www.ifoam.org/about_ifoam/principles/index.html [2012-05-08].

IFOAM (2002) *Organic Agriculture Can Deliver Food Security*. Position paper for the World Food Summit in Rome June 2002. Johannesburg, South Africa.

Jacobsen, R. (2009) Organic Agriculture in Uganda. [online]. Available from: http://diggy.ruc.dk:8080/bitstream/1800/4891/1/Organic%20Agriculture%20in%20Uganda.pdf [2012-05-07].

Johnston, S. (2010) Assessing Farmer Interest in Transition to Organic Production and Barriers to Expansion of Organic Production in New York State. [online] Available from: http://www.agriculture.ny.gov/AP/organic/docs/organic_production_transition.pdf [2012-06-05].

Kaiser, F. G., Wolfing, S., Führer, U. (1999). Environmental attitude and ecological behaviour. *Journal of Environmental Psychology* 19, 1-19.

Kaltoft, P. (1999) Values about nature in organic farming practice and knowledge. *Socioligia Ruralis* 39(1), 39-53.

Khaledi, M., Gray, R., Weseen, S., Sawyer, E. (2007) Assessing the Barriers to Conversion to Organic Farming: An Institutional Analysis. [online] Available from: http://organic.usask.ca/reports/Assessing%20the%20Barriers%20-%20Organic%20-%20Final.pdf [2012-06-06].

Kidd, A.D., Tulip, A., Walaga, C. (2001) Benefits of Globalisation for Poor Farmers – A Story of Organic Produce Exports from Uganda. *BeraterInnen News* 2/2001, 25-31.

Larson, B.A. and Frisvold, G.B. (1996) Fertilizers to support agricultural development in sub-Saharan Africa: what is needed and why. *Food Policy* 21(6), 509-525.

Lewis, C.P., Newell, J.N., Herron, C.M., Nawabu, H. (2010) Tanzanian farmers' knowledge and attitudes to GM biotechnology and the potential use of GM crops to provide improved levels of food security - A qualitative study. *BMC Public Health* 10(407).

Lockie, S., Lyons, K., Lawrence, G., Halpin, D. (2006) *Going Organic – Mobilizing networks for environmentally responsible food production*. Gateshead: Athenaeum Press.

MAAIF (2009) Uganda – Review of Ongoing Agricultural Development Efforts. Comprehensive Africa Agriculture Development Programme. Brochure 2 – October 2009. [online]. Available from: http://www.pma.go.ug/docs/CAADP%20Brochure%202.pdf [2012-04-27].

MAAIF (n.d.) Crop Diseases and Pests Control. [online] (n.d.). Available from: http://www.agriculture.go.ug/index.php?page=projects&id=26 [2012-04-27].

McCarthy, M., O'Reilly, S., O'Sullivan, A., Guerin, P. (n.d.) An Investigation into the Determinants of Commitment to Organic Farming in Ireland. [online]. Available from: http://www.ifmaonline.org/pdf/congress/07McCarthy_etal_2.pdf [2012-05-07].

McEachern, M.G. and Willock, J. (2004) Producers and consumers of organic meat: A focus on attitudes and motivations. *British Food Journal* 106(7), 534-552.

Mukhebi, A., Mbogoh, S., Matungulu, K. (2010) An Overview of the Food Security Situation in Eastern Africa. [online]. Available from: http://www.uneca.org/ea/meetings/srcm2010/Food%20Security%20OVERVIEW.pdf [2012-05-07].

Nalubwama, S.M., Mugisha, A., Vaarst, M. (2011) Organic livestock production in Uganda: potentials, challenges and prospects. *Trop Anim Health Prod* 43, 749-757.

Namassi, J. (2008) Use of inorganic fertilizer in Uganda. Uganda Strategy Support Program. IFPRI. Brief no 4.

Namuwoza, C. and Tushmerirwe, H. (2011) Country report Uganda. In: Willer, H. and Kilcher, L. (Eds.) *The World of Organic Agriculture. Statistics and Emerging Trends 2011*. 117-120. IFOAM, Bonn, & FiBL, Frick.

Ndungu, S.K. (2006) The development of a consumer awareness and education concept based on a consumer survey of attitudes and preferences towards organic foods and on the review of existing PR materials in East Africa. IFOAM Survey Report. [online] Available from: http://www.ifoam.org/partners/projects/pdfs/Ifoam%20Survey%20Report.pdf [2012-06-05].

NEMA (2007) *State of Environment Report for Uganda 2006/07*. Kampala: NEMA.

NEMA (2004) Luweero District State of Environment Report 2004. [online] Available from: http://www.nemaug.org/district_reports/luwero_2004_report.pdf [2012-05-13].

NEMA (1998) Rakai District State of Environment Report. [online] Available from: http://www.unep.org/Pearl/Login/OP/BLOBS/FullText/PEARLFullTextBLOB_1531_645.pdf [2012-05-13].

Neufeldt, H., Wilkes, A., Zomer, R.J., Xu, J., Nang'ole, E., Munster, C., Place, F. (2009) Trees on farms: Tackling the triple challenges of mitigation, adaptation and food security. *World Agroforestry Centre Policy Brief 07*. World Agroforestry Centre, Nairobi, Kenya.

Nuntapanich, P. (2012) Using a Participatory Learning Approach to Improve Farmers' Knowledge of Organic Agricultural Practices: A Case Study of the Sisaket Province in Northeast Thailand. *The Social Sciences 7, 61-64.*

Omamo, S.W. (2003) Fertilizer Trade and Pricing in Uganda. *Agrekon* 42(4), 310-324.

Omiat, G. and Diiro, G. (2005) Rationalization and Harmonization of Fertilizer Policies, Laws, Regulations and Procedures in Uganda. [online]. Available from: http://www.asareca.org/paap/uploads/publications/Rationalization%20and%20Harmonization%20of%20Fertilizer%20policies,%20laws,%20Regulations%20and%20Procedures%20in%20Uganda.pdf [2012-04-27].

Opolot, O.S., Kasangaki, D., Rusoke, C. (n.d.) Organic Agricultural Development in Uganda. [online]. Available from: http://www.unep-unctad.org/cbtf/events/dsalaam2/day%202/panel%20presentation/ORGANIC%20AGRICULTURAL%20DEVELOPMENT%20IN%20UGANDApapaer.pdf [2012-05-06].

Parrot, N. and Marsden, T. (2002) *The Real Green Revolution – Organic and agroecological farming in the South*. Greenpeace Environmental Trust. United Kingdom: Russell Press.

Pender, J. and Mertz, O. (2006) Soil fertility depletion in Sub-Saharan Africa: what is the role of organic agriculture? In: Halberg, N., Fjelsted Alroe, H., Knudsen Trydeman, M., Steen Kristensen, E. (Eds.) *Global Development of Organic Agriculture: Challenges and Prospects*. 215-240. Wallingford: CABI Publishing.

PSFU (2006) Policy Brief: Agro-chemicals – Certification and the need for Advocacy. [online] Available from: http://psfuganda.org/forms/policy/Agro-chemicalcertificn.pdf [2012-05-28].

Sahota, A. (2009) The Global Market for Organic Food & Drink. In: Willer, H. and Kilcher, L. (Eds.) *The World of Organic Agriculture. Statistics and Emerging Trends 2009*. 59-64. FIBL-IFOAM Report. Bonn; FiBL, Frick; ITC, Geneva.

Sall, M. (2012) *The REVA PLAN in Senegal: Does modern farming of change minds of young people about agriculture*? Paper prepared for the conference Young People, Farming and Food, 19-21 March 2012, Accra Ghana.

Sarker, A. and Itohara, Y. (2008) Organic farming and poverty elimination: a suggested model for Bangladesh. *Journal of Organic Systems* 3(1), 68-79.

Schoon, B. and Te Grotenhuis, R. (2000) Values of farmers, sustainability and agricultural policy. *Journal of Agricultural and Environmental Ethics* 12, 17-27.

Scialabba, N. (2000) Factors Influencing Organic Agriculture Policies With A Focus On Developing Countries. [online] Available from: http://www.fao.org/docs/eims/upload/230159/BaselSum-final.pdf [2012-05-16].

Svotwa, E., Baipai, R., Jiyane, J. (2009) Organic farming in the smallholder farming sector of Zimbabwe. *Journal of Organic Systems* 4(1), 8-14.

Toric, B. (2005) *Social dimensions in rural land use management in the Avon River Basin: A qualitative survey based on the Theory of Planned Behaviour*. Resource Management Technical Report 301. Department of Agriculture. Government of Western Australia.

UBOS (2006) 2002 Uganda Population and Housing Census – Analytical Report – Population Size and Distribution. [online] Available from:

http://www.ubos.org/onlinefiles/uploads/ubos/pdf%20documents/2002%20CensusPopnSizeGrowthAnalyticalReport.pdf [2012-05-15].

UBOS (2011) *Uganda Census of Agriculture 2008/09 at a Glance. UBOS in collaboration with MAAIF*. [online]. Available from: http://www.ubos.org/onlinefiles/uploads/ubos/pdf%20documents/UCAGlance.pdf [2012-05-07].

UNCTAD (2009) Sustaining African Agriculture – Organic Production. UNCTAD Policy Briefs Nr 6 February 2009. [online] Available from: http://archive.unctad.org/en/docs/presspb20086_en.pdf [2012-06-14].

UNECA (2011) A Green Economy in the Context of Sustainable Development: What are the implications for Africa? [online]. Available from: http://www.uneca.org/cfm/2011/documents/English/GreenEconomy.pdf [2012-04-27].

UNEP (n.d) Organic agriculture in Uganda. [online] (n.d.). Available from: http://www.unep.org/greeneconomy/SuccessStories/OrganicagricultureinUganda/tabid/29866/Default.aspx [2012-05-02].

UNEP-UNCTAD, (2008a) *Best Practices for Organic Policy – What developing country Governments can do to promote the organic agriculture sector*. UNCTAD/DITC/TED/2007/3 New York and Geneva: United Nations Publication.

UNEP-UNCTAD. (2008b) *Organic Agriculture and Food Security in Africa*. UNCTAD/DITC/TED/2007/15. New York and Geneva: United Nations Publication.

UOS, 2006. Uganda Organic Standard. For Organic Production and Processing. [online]. Available from: http://www.nogamu.org.ug/docs/uos.pdf [2012-05-08].

Van Elzakker, B. and Leijdens, M. (2000) *Not aid but trade: Export of organic products from Africa.* 5 years EPOPA programme. Netherlands: Agro Eco Consultancy.

Walaga, C. (2005) *Organic agriculture in Kenya and Uganda. Study visit report*. CTA number 8033. Wageningen: CTA.

Walaga, C. and Hauser, M. (2005) Achieving household food security through organic agriculture? Lessons from Uganda. *Journal für Entwicklungspolitik* XXI/3, 65-84.

Wehinger, T., Freyer, B., Hoffmann, V. (2002) Stakeholder Analysis in the Conversion to Organic Farming. *Pre-proceedings to the Fifth IFSA European Symposium on Farming and Systems Research and Extension - Local Identities and Globalisation, Florence, Italy* (8.-11.04.2002), 765-776.

Wiggins, S. (2005) Success Stories from African Agriculture: What are the Key Elements of Success?. *IDS Bulletin 36.2 New Directions for African Agriculture*, 17-22.

Willer, H. and Kilcher, L. (2012) Organic Agriculture 2012: Key Indicators and Leading Countries In: Willer, H. and Kilcher, L. (Eds.) *The World of Organic Agriculture - Statistics and Emerging Trends 2012*. 25-32. Research Institute of Organic Agriculture (FiBL), Frick,

and International Federation of Organic Agriculture Movements (IFOAM), Bonn V 2.0 10/02/2012.

Zake, J. S., Nkwine, C & Magunda, M. K. (1999) Country Report Uganda. In: Nabhan, H., Mashali, A.M., Mermut, A.R. (Eds.) *Integrated Soil Management for Sustainable Agriculture and Food Security in Southern and Eastern Africa. Proceedings of the expert consultation. Harare, Zimbabwe*. AGL/MISC/23/99. 319-336. Rome: FAO.

Interview guide

Demographic profile questions
Gender
Age
Education
Household size
Farm size
Owns/hires land
Crops grown on farm
Wetlands/forests conserved on farm
Animals
Subsistence or for profit farming
    If for profit farming, for export or domestic market
Member of farmers' group
Other role in the society (except being a farmer)

Gaining knowledge and information
- Where/how did you learn how to farm?
- Do you get training/information today? - from whom? - is it helpful?

Methods used
- How do you keep the soil fertile?
    Why do you use these methods?
    Is this the common way to do it? Neighbors/friends use the same methods?
    Is it successful? What do you think about the soil fertility on your farm?
    Is there anyone who influences which methods you use?

- How do you manage crop protection?
    Why do you use these methods?
    Is this the common way to do it? Neighbors/friends use the same methods?
    Is it successful? Is pests and diseases a big problem on your farm?
    Is there anyone who influences which methods you use?

- Do you have access to chemicals and artificial fertilizers? - could you buy them if you wanted to?
- Do you use chemicals and artificial fertilizers? - why?/why not? - since when?
- Have you used chemicals and artificial fertilizers before? - when was the last time? - why did you stop?

Knowledge about organic
- What is "organic agriculture" to you? - positive/negative aspects?
- Do you feel that you have enough knowledge about organic production methods? - feel able to manage these? - need to know more about something?
- Do you feel confident on supporting your family using organic methods? - also in the future?
- Do you have any concerns about using organic methods?
- Have you heard that organic crops are good or bad? - where from?

Knowledge about conventional
- What is "conventional agriculture" to you? - positive/negative aspects?
- What do you know about chemicals and artificial fertilizers?

- What do you think about conventional production methods? - do you feel able to manage these? – need more knowledge?
- Do you have any concerns about using conventional methods?
- Have you heard that conventional crops are good or bad? - where from?

Questions to organic farmers:

- Would anything stop you using organic methods and starting to use conventional methods instead?
- What would happen if you started to use chemicals and artificial fertilizers?
  - To harvests?
  - What would neighbors/friends/family say? - right/wrong thing to do?
- What would happen to your income/ standard of life if you used conventional techniques?
- Do you think organic and conventional methods have different influence on human health?
- Do you think there is a difference in profitability between organic and conventional methods?

- Why/why not certified as organic?
- Would it be easier/more difficult to sell crops if you were certified?

Questions to conventional farmers:

- Would anything stop you using conventional methods and starting to use only organic methods instead?
- What would happen if you stopped using chemicals and artificial fertilizers?
  - To harvests?
  - What would neighbors/friends/family say? - right/wrong thing to do?
- What would happen to your income/ standard of life if you used organic techniques?
- Do you think organic and conventional methods have different influence on human health?
- Do you think there is a difference in profitability between organic and conventional methods?

Market access

- What kind of markets can you access to sell your products on?
- Would it be easier/more difficult to sell crops if you used conventional methods?
- Would it be easier/more difficult to sell crops if you used organic methods?

Perceptions on how production on farm could be improved

- Do you have any problems on your farm at the moment? - any solution for this?
- How would/could you do to increase production on your farm and farm better?

Environmental concern

- What do you think about environmental conservation? Do you do it on your farm? Is it important? Why?
- What is your perception of the climate in the area? How does it affect which methods you use? How it is related to your way of farming?

Satisfaction with situation

- Are you satisfied with your farm? Want to change something?
- Do you want your children to take over your farm in the future? - is it important that they continue to farm it the way you do, using the same methods? Why?

Going organic in Uganda?

EMMELIE JOHANSSON

Whether or not to use organic farming methods is a highly relevant question for smallholder farmers in Uganda. But not all of them can make an active choice. Several barriers exist that can prevent farmers from using organic methods, and force them to be "conventional by default". Can something be done about this to give more farmers the possibility to choose organic methods?

Fig 1. Tools used by an organic farmer in Uganda.

The use of organic farming methods has been promoted as a promising way for smallholder farmers in developing countries to increase income and improve food security (UNCTAD, 2009). It also reduces the health risks associated with use of chemicals. Uganda is a country with a large part of the population involved in the agricultural sector, and the country is often used as an example of a good place to pursue organic agriculture because of the low existing use of artificial inputs. This has led to the country often being referred to in literature as "organic by default", implying that farmers are forced to use organic methods because artificial inputs are not available or affordable (Walaga and Hauser, 2005). A new study investigating why farmers use, or do not use, organic methods however show that there are also farmers who are "conventional by default" (Johansson, 2012).

The theory of planned behavior

When looking into why farmers use organic methods a helpful concept to use is the *theory of planned behavior* developed by Ajzen (1991).

According to this theory, our *intention* to carry out a certain *behavior* is influenced by a set of *beliefs* (behavioral, normative and control beliefs); forming *attitudes*, *subjective norm* and *perceived behavioral control*. Whether or not the behavior is actually carried out is also influenced by the amount of *actual control* the individual has over the behavior.

In the case of organic farming; the intention is the farmer's commitment to use organic methods, attitudes reflects the farmer's thoughts about organic methods, subjective norm is the influence of important others concerning which methods to use, and perceived behavioral control represents the perceived capability to successfully use organic methods. Depending on the amount of actual control, e.g. availability of organic manure, the farmer will then carry out the behavior, i.e. use organic methods.

The theory of planned behavior was used in a SIDA-financed Minor Field Study project in Uganda in 2012,

exploring preconditions for, and barriers to, the use of organic methods through investigating why, or why not, farmers use organic methods. The study resulted in a master's thesis on which this fact sheet is based.

Positive attitudes towards organic

Both conventional and organic farmers in Uganda showed very positive attitudes towards the use of organic farming methods for soil fertility management and crop protection. These positive attitudes originated from beliefs that organic methods are better than conventional in how they affect human health and environment. However, when it came to economic performance the beliefs were more varied, and it can generally be said that most conventional farmers believed conventional methods to be more profitable, while a majority of the organic farmers believed organic methods to be more profitable. Economic incentives were found to have great influence over whether or not farmers intended to use organic methods.

Influence from important others

Other people in the farmers' surroundings were also found to influence which methods farmers use. Other farmers in the neighborhood acted as inspiration and sometimes also created a perceived pressure to use organic methods. Extension workers were seen as important sources of information, and their advice on which methods to use were very valuable for the farmers. In areas where companies exporting certified organic products existed these companies had strong influence, and many farmers had started to use organic methods because of them. Media campaigns about health benefits with use of organic methods also had some influence over the farmers, through creating a positive opinion towards organic in the society.

Fig 2. For farmers who do not have animals it can be both difficult and expensive to access organic manure.

Limited by perceived behavioral control

Despite the general positive attitudes amongst the farmers and in society towards use of organic methods some farmers felt that they could not use them. A common belief among the conventional farmers was that if they only used organic methods they would not be able to support their families. Some farmers felt that they did not have enough knowledge about organic methods to use them successfully. Others felt that organic methods were too time- and labor consuming, a problem mainly for older farmers who found hard manual labor too tiresome.

"Conventional by default"

For some of the farmers the use of organic methods was not even an option. The limited actual control they had over the situation made it impossible for them to make an active choice. They could not access enough organic manure or the material needed to mix biorationals for organic crop protection. Instead, they were forced to use artificial inputs, and were thereby "conventional by default". In the same way as a few of the organic farmers in this study actually were "organic by default" – they only used organic methods because they could not access artificial inputs – some of the conventional farmers were left with no choice but to use artificial inputs because organic material was either unavailable or unaffordable for them.

What is needed to make organic methods available for more farmers?

When asked which methods they would prefer to use, a majority of the Ugandan farmers, organic as well as conventional, said that they would prefer to use only organic methods. Concerns for health problems and environmental damage caused by chemicals were the main motivators. The study however identified some important barriers which need to be removed to enable these farmers to choose organic methods. Of equal importance to enabling conventional farmers to convert to organic methods is ensuring that organic farmers can continue to use organic methods. However, the study revealed that organic farmers have concerns about some things that might force them to change to conventional methods, in general the same things identified as barriers to the use of organic methods by conventional farmers. These problems must be solved for organic methods to be used. The rest of this fact sheet will therefore present some suggested actions to improve the preconditions for use of organic methods:

More knowledge

Farmers feeling that they do not know enough about organic methods to use them successfully must be given the opportunity to learn more. Focus should be upon practical implementation of methods, and farmers should be encouraged to learn and get inspiration from each other.

Improved access to organic material

To be able to use organic methods farmers need to be able to access enough organic material needed for soil fertility management and crop protection. This means that farmers who cannot produce enough material on their farms or collect it in the surrounding environment must be given the possibility to purchase it in shops, or from other farmers. A possibility to increase availability of organic material is to take one step up from the individual farm level, and help farmers collaborate with each other. One farmer might have excess manure, but lack ingredients for biorationals, and vice versa. This type of collaboration occurs already today, when farmers buy or exchange material with each other, but it could be done through more organized forms e.g. through the farmers' groups.

Fig 3. Offering farmers more knowledge about practical use of organic methods for crop protection, like this pest trap, is important.

Improve the status of farming as occupation

A problem in Uganda today is that farming is seen by many as a low-status occupation, making it difficult and expensive for smallholders to find the labor needed for the more labor-intensive organic methods. Especially young people prefer to look for other jobs. To increase the availability of labor in agriculture it is necessary to improve the status of farming as occupation. The problem is that it is the image of agriculture as tiresome and dirty that has given it low status in the first place, and since organic methods often mean more manual labor, such as weeding with a hoe, this does not help to make farming more attractive. Developing less tiresome organic methods, and educating the public in what farmers contribute with, e.g. food, ecosystem services etc. could help to change the opinion.

Local market for organic products

Today there is no labeling of organic products on the local markets in Uganda. This makes it impossible to distinguish between organic and conventional products, and they are sold at the same price. Lack of market and concerns about profitability for organic products is seen as a barrier by many conventional farmers, and a problem by many organic farmers. They mean that when you use organic farming methods you get a smaller harvest output in relation to your inputs, due to organic

methods being more time- and labor consuming than conventional methods. When there is no premium price for the organic products it is just not worth the extra effort for many farmers. This can be a problem also for certified organic farmers producing for the export market. Even though they receive a premium price for the crops they sell for export, the export company many times only buys a small part of the harvest from each farmer. The rest must then be sold at the local market, most of the times for the same price as conventional products. People in the study say that they prefer to eat organic crops because they are sure these contain no residues of chemicals. A market where it is possible to distinguish between organic and conventional products would help to increase the demand for organic products, and make it more profitable to use organic methods.

Fig 4. The price for organic products on the local market is often the same as for conventional products.

Mitigate climate change

The ongoing climate change has already made climate in Uganda dryer and the rain seasons more unpredictable. Lack of water reduces the availability of material needed in organic farming, and creates further difficulties in keeping the animals needed for organic manure. Although climate change is a global problem, things can be done regionally and locally to improve the situation. Reducing deforestation and stop draining of wetlands, in combination with planting of trees and building of soil- and water conservation structures can make the local climate less dry, and thus facilitate an expanded use of organic methods.

More research

If organic methods for soil fertility management and crop protection are to be used by farmers in Uganda, they need to be effective. They need to be suitable for the specific conditions in Uganda, and also be able to handle changing conditions, e.g. new pests and diseases that might come with the change in climate. To ensure that methods are up to date and adapted to Ugandan conditions, continuous research should be carried out in Uganda. This research should be in close collaboration with farmers, so that it can try to find solutions for the problems they face at the moment. Research findings must also be transferred back to farmers in a good way, so that they can benefit from improved methods.

More support to the agricultural sector

The measures suggested above are not without costs, and financing must come from somewhere whether it is the government or non-governmental organizations. The share of Uganda's national budget allocated to the agricultural sector has not been over 3% during the past two decades and even when donor financing is included the allocation to agriculture has never exceeded 5% of the budget (MAAIF, 2009). Considering the large share of the population involved in agriculture in Uganda, more money should be allocated to the sector. Creating an enabling environment for the use of organic methods is to give the farmers in Uganda the possibility to choose which farming methods they want to use.

References

Ajzen, I. (1991) The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes* 50, 179-211.

Johansson, E. (2012) *Preconditions for and barriers to use of organic agricultural methods in Uganda – Exploring farmers' perspectives through the Theory of Planned Behavior*. Master's Thesis in Agroecology. Alnarp: Sveriges Lantbruksuniversitet.

MAAIF (2009) Uganda – Review of Ongoing Agricultural Development Efforts. Comprehensive Africa Agriculture Development Programme. Brochure 2 – October 2009.

UNCTAD (2009) Sustaining African Agriculture – Organic Production. UNCTAD Policy Briefs Nr 6 February 2009.

Walaga, C. and Hauser, M. (2005) Achieving household food security through organic agriculture? Lessons from Uganda. *Journal für Entwicklungspolitik* XXI/3, 65-84.